ORDER NO. HAD8607596S2

Service Manual

Tuner

ST-Z990

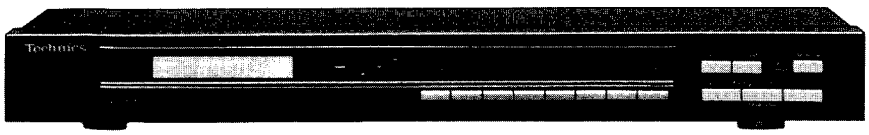
ST-Z990

QUARTZ

Synthesizer AM/FM Stereo Tuner

Color

(K)...Black Type



Color	Area
(K)	[EG]...F.R Germany

Please use this manual together with the service manual for model No. ST-Z990/Z990L Order No. HAD8604446C8.

TECHNISCHE DATEN

(DIN 45 500)

■ UKW-TUNERTEIL

Wellenbereich	87,50~108,00 MHz (0,05-MHz-Schritte)
Eingangsempfindlichkeit	
S/R 30 dB	1,3 µV (75Ω)
S/R 26 dB	1,2 µV (75Ω)
S/R 20 dB	0,9 µV (75Ω)
Nutzempfindlichkeit nach IHF	1,5µV/75Ω (nach IHF '58)
Stereoumschaltschwelle bei 46 dB nac IHF	28µV/75Ω
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	70 dB (78 dB nach IHF '58)
Stereo	65 dB (71 dB nach IHF '58)
Frequenzgang	20 Hz~15 kHz (+0,5 dB~−1,5 dB)
Trennschärfe bei Störsender	
normal ±400 kHz	70 dB
Einfangverhältnis	1,0 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	90 dB
ZF-Dämpfung bei 98 MHz	90 dB
Ansprechdämpfung auf	
Nebenfrequenzen bei 98 MHz	100 dB
MW-Unterdrückung	55 dB
Übersprechdämpfung	
1 kHz	40 dB
Trägerrest	
19 kHz	−70 dB (−80 dB nach IHF)
38 kHz	−75 dB (−80 dB nach IHF)
Kanalabweichung (250 Hz~6300 Hz)	±1,2 dB
Begrenzereinsatz	1,2 µV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	75Ω (unsymmetrisch)

■ MW-TUNERTEIL

Wellenbereich	522~1611 kHz (9-kHz-Schritte) 530~1620 kHz (10-kHz-Schritte)
Eingangsempfindlichkeit (S/N 20 dB)	20µV, 300µV/m
Trennschärfe (±9 kHz)	55 dB
Spiegelfrequenz-Dämpfung bei 999 kHz	40 dB
ZF-Dämpfung bei 999 kHz	60 dB

■ ALLGEMEINE DATEN

Ausgangsspannung	0,6 V (1,0 V, IHF)
Leistungsaufnahme	9 W
Netzspannung	Wechselstrom 50 Hz/60 Hz, 8,6 V
Abmessungen (B×H×T)	430×53×150 mm
Gewicht	1,1 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

(Die technischen Daten können infolge von Verbesserungen ohne Ankündigung geändert werden.)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ MEASUREMENTS AND ADJUSTMENTS (ADDITION)

Addition

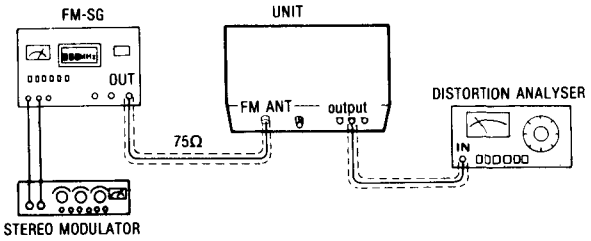
Note: For **T201 (AM-IFT), L204 (AM OSC coil),** **L301, L302 (19kHz/38kHz L.P.F.) and L101 ("Antibirdy"-Filter)**, adjusted parts are supplied. So, do not turn the cores of this parts.

Addition

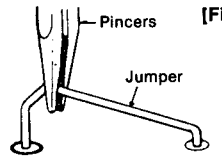
FM IFT ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit into "**FM on/auto**" position. (by FM mode select button.)
3. Place the radio frequency display and signal generator setting to **101.1 MHz.**
4. Adjust **T1** so that distortion factor of Lch. is minimized.
5. Make sure that the distortion factors of Lch. and Rch. are Rch. are at minimum and nearly equal.

FM SIGNAL GENERATOR CONDITION
Modulation.....90% (Pilot 10%)
Modulation frequency.....L mode 400Hz (Pilot 19kHz)
Output level.....66dB

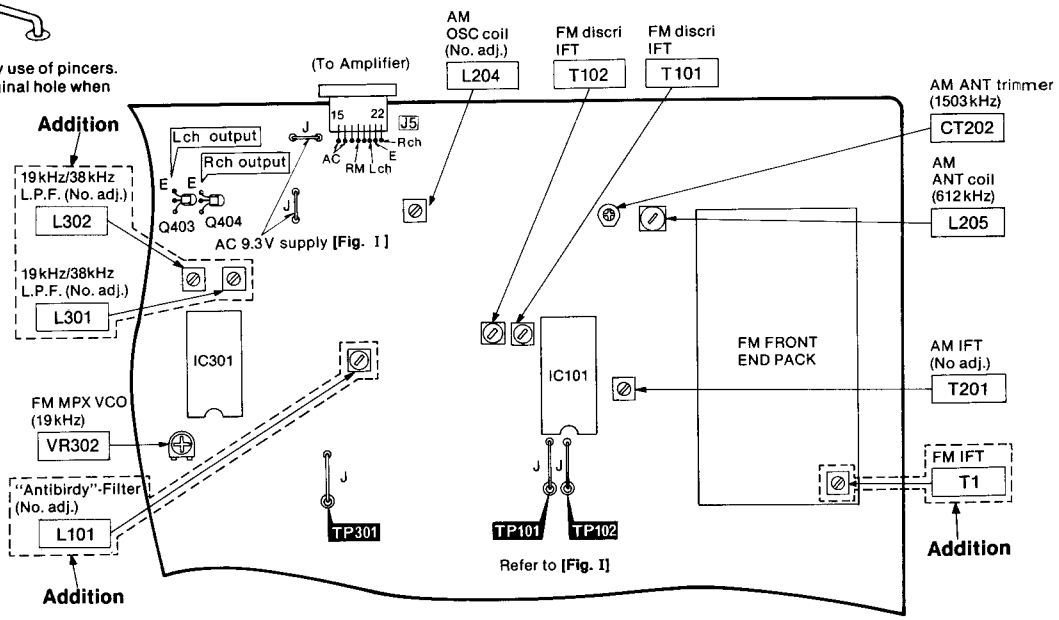


• Adjustment points



[Fig. I]

It can be removed by use of pincers. Insert it into the original hole when not needed.



■ RESISTORS AND CAPACITORS

Notes: • Part numbers are indicated on most mechanical parts.
Please use this part number for parts order.

- The unit of resistance is OHM (Ω). K=1000Ω, M=1000Ω
- The unit of capacitance is MICROFARAD (μF). P=10^{-6}μF.

• CAPACITORS

Ref. No.	Part No.	Value
C1	ECCD1H330KC	33P
C2	ECKD1H103ZF	0.01
C101	ECKD1H103ZF	0.01
C103	ECKD1H103ZF	0.01
C105	ECCD1H270K	27P
C107	ECEA1HU010	1
C108	ECEA1CU100	10
C109	ECKD1H103ZF	0.01
C110	ECEA1CU100	10
C111	ECCD1H101K	100P
C112, 113	ECKD1H223ZF	0.022
C114	ECKD1H223ZF	0.022
C115	ECCD1H100KC	10P
C201	ECQM1H473JZ	0.047
C203	ECCD1H180KC	18P

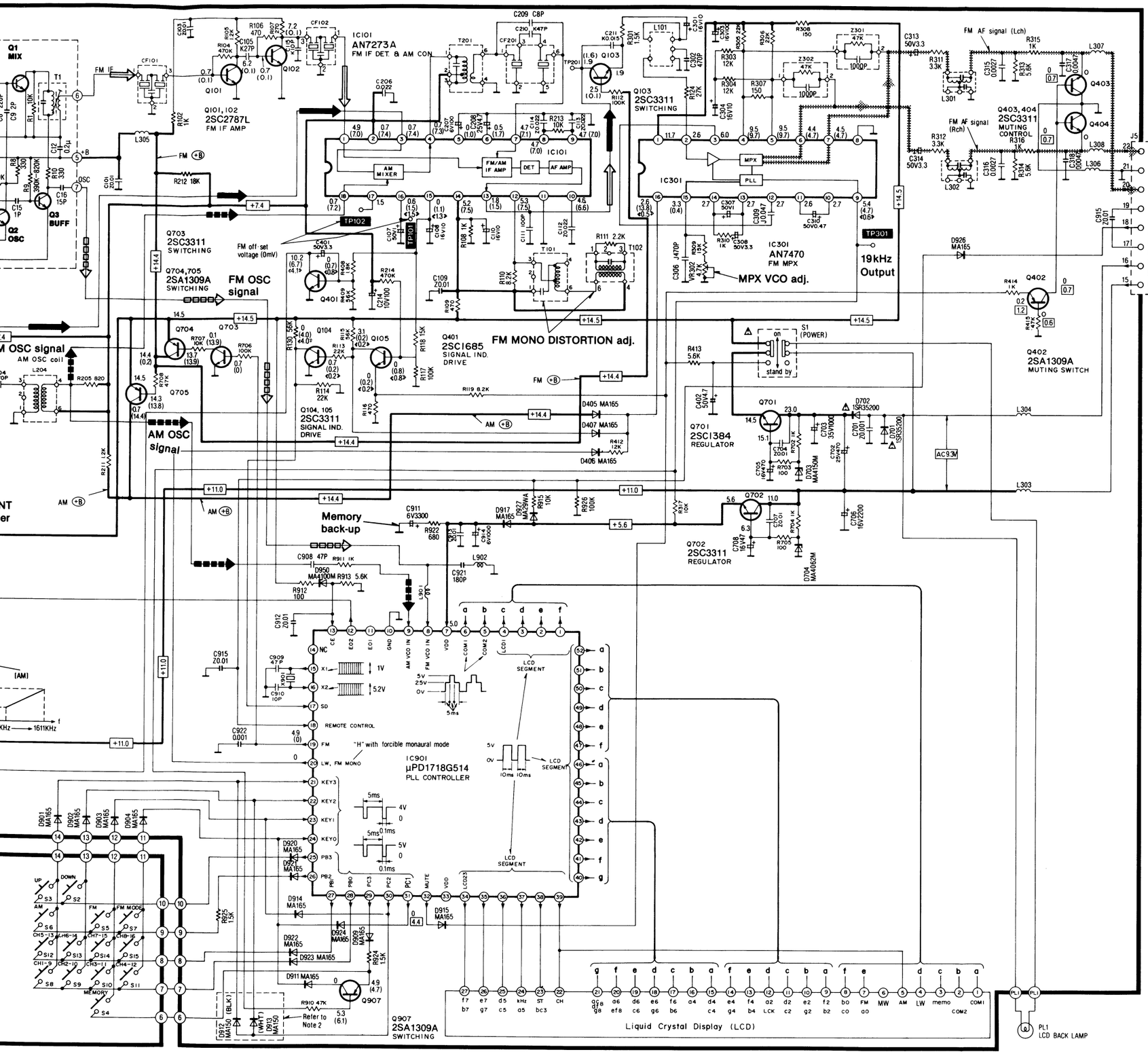
Ref. No.	Part No.	Value
C204	ECQP1471JZ	470P
C206	ECKD1H223ZF	0.022
C207	ECEA0JU101	100
C208	ECEA1EK4R7	4.7
C209	ECCD1H080CC	8P
C210	ECCD1H470K	47P
C211	ECFTD153KXL	0.015
C213	ECKD1H223ZF	0.022
C214	ECEA1AU101	100
C301	ECEA1CU100	10
C302	ECKD1H471K	470P
C303	ECEA1CU101	100
C304	ECEA1CU100	10
C306	ECQP1471JZ	470P
C307	ECEA1HK010	1

Ref. No.	Part No.	Value
C308	ECEA1HK3R3	3.3
C309	ECKD1H473ZF	0.047
C310	ECEA1HUR47	0.47
C313, 314	ECEA1HU3R3	3.3
C315, 316	ECFTD272KXL	0.0027
C317, 318	ECFTD472KXL	0.0047
C401	ECEA1HU3R3	3.3
C402	ECEA1HU4R7	4.7
C701	ECKD2H102ZF	0.001
C702	ECEA1EU471	470
C703	ECEA1VU102	1000
C704	ECKD1H103ZF	0.01
C705	ECEA1CU471	470
C706	ECEA1CU222	2200
C707	ECKD1H103ZF	0.01

Ref. No.	Part No.	Value
C708	ECEA[illegible]U470	47
C902	ECKD[illegible]223ZF	0.022
C903	ECEA[illegible]M4R7R	4.7
C904	ECKD[illegible]103ZF	0.01
C908, 909	ECCD[illegible]470K	47P
C910	ECCD[illegible]100KC	10P
C911	ECEA[illegible]J332	3300
C912, 913	ECKD[illegible]103ZF	0.01
C914	ECEA[illegible]J102	1000
C915	ECKD[illegible]103ZF	0.01
C921	ECCD[illegible]181K	180P
C922	RCBS[illegible]02KBY	0.001

● RESISTORS

Ref. No.	Part No.	Value
R102	ERDS2TJ102	1K
R104	ERDS2TJ474	470K
R105	ERDS2TJ122	1.2K
R106	ERDS2TJ474	470K
R107	ERDS2TJ271	270
R108	ERDS2TJ102	1K
R109	ERDS2TJ471	470
R110	ERDS2TJ822	8.2K
R111	ERDS2TJ222	2.2K
R112	ERDS2TJ104	100K
R113, 114	ERDS2TJ223	22K
R115	ERDS2TJ563	56K
R116	ERDS2TJ471	470
R117	ERDS2TJ104	100K
R118	ERDS2TJ153	15K
R119	ERDS2TJ822	8.2K
R124	ERDS2TJ273	27K
R130	ERDS2TJ563	56K
R202	ERDS2TJ102	1K
R204	ERDS2TJ104	100K
R205	ERDS2TJ821	820
R211	ERDS2TJ122	1.2K
R212	ERDS2TJ183	18K
R213	ERDS2TJ103	10K
R214	ERDS2TJ474	470K
R301	ERDS2TJ152	1.5K
R303, 304	ERDS2TJ123	12K
R305, 306	ERDS2TJ223	22K
R307	ERDS2TJ154	150K
R308	ERDS2TJ151	150
R309	ERDS2TJ153	15K
R310	ERDS2TJ102	1K
R311, 312	ERDS2TJ332	3.3K
R313, 314	ERDS2TJ562	5.6K
R315, 316	ERDS2TJ102	1K
R317	ERDS2TJ103	10K
R401	ERDS2TJ331	330
R402	ERDS2TJ221	220
R403	ERDS2TJ181	180
R404	ERDS2TJ151	150
R405	ERDS2TJ122	1.2K
R406	ERDS2TJ561	560
R408	ERDS2TJ182	1.8K
R409	ERDS2TJ563	56K
R412	ERDS2TJ123	12K
R413	ERDS2TJ562	5.6K
R414	ERDS2TJ102	1K
R415	ERDS2TJ473	47K
R702	ERDS2TJ102	1K
R703	ERDS2TJ101	100
R704	ERDS2TJ102	1K
R705	ERDS2TJ101	100
R706	ERDS2TJ104	100K
R707	ERDS2TJ103	10K
R708	ERDS2TJ473	47K
R902	ERDS2TJ562	5.6K
R903	ERDS2TJ103	10K
R904	ERDS2TJ561	560
R905	ERDS2TJ102	1K
R910	ERDS2TJ473	47K
R911	ERDS2TJ102	1K
R912	ERDS2TJ101	100
R913	ERDS2TJ562	5.6K
R915	ERDS2TJ103	10K
R922	ERDS2TJ681	680
R924, 925	ERDS2TJ152	1.5K
R926	ERDS2TJ104	100K



■SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

- **S1** : Power switch in "on" position.
- **S2** : Tuning (down) switch.
  [down: tuning to lower frequency]
- **S3** : Tuning (up) switch.
  [up: tuning to higher frequency]
- **S4** : Memory set switch. (manual ↔ auto memory)
- **S5** : FM select switch.
- **S6** : AM select switch.
- **S7** : FM mode switch. (stereo ↔ mono)
- **S8~S15** : Preset tuning switch.

  * With it momentarily pushed (less than 0.4 sec.) and released, the 1~8 CH are received.
  * With it continuously pushed (0.4 sec. or more) and released, the 9~16 CH are received.

- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
  All voltage values shown in circuitry are DC voltage in FM signal (no signal) reception modes.
  * Figures in ◀ ▶ stand for DC voltage in FM stereo signal reception mode.
  * Figures in ( ) stand for DC voltage in AM signal reception mode.
  * Figures in ▭ stand for muting mode.

  Positive voltage lines
  FM OSC
  AM OSC
  AF signal lines
  FM signal
  AM signal

- Important safety notice.
  Components identified by ⚠ mark have special characteristics important for safety.
  When replacing any of these components, use only manufacturer's specified parts.

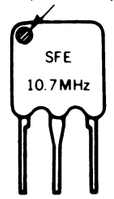
Part No.	Original Part No.	Supply Part No.
IC301	AN7470	SVIUPC1161C3
D912, 913	MA150	MA162A

Note 2:

• Use of ceramic filters in pairs

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three versions. For this circuit, be sure to use the ceramics of the same version in a pair.
At repairing and replacement, pay close attention to the diodes (D912, D913) for use as different diodes must be used depending on each version of the ceramic filters.

Color marking
(Red, Black or White)



VERSION (Color)	D912	D913	CENTER FREQUENCY
Black	○	×	10.65MHz
Red	×	×	10.70MHz
White	×	○	10.75MHz

Note: ○ mark: Diode is used.
× mark: Diode is not used.

∗ Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

■ REPLACEMENT PARTS LIST

Notes: • Part numbers are indicated on most mechanical parts.
Please use this part number for parts order.

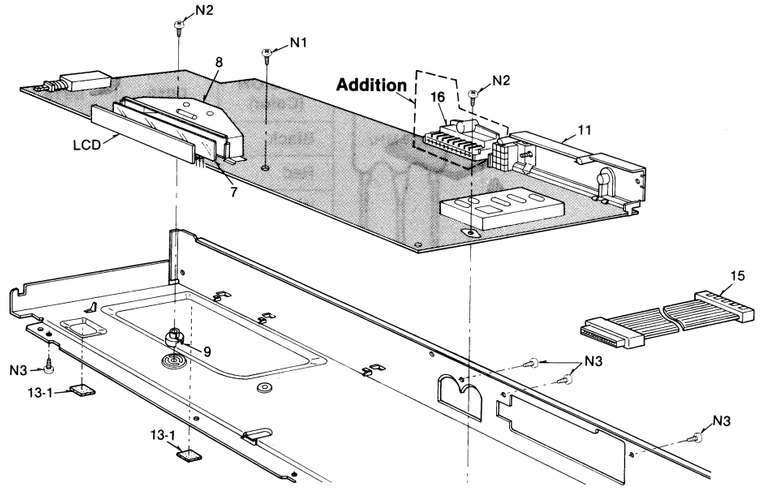
• The parenthesized numbers in the column of description
stand for the quantity per set.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN7273B	Integrated Circuit
IC301	SVIUPC1161C3	Integrated Circuit
IC901	UPD1718G514	Integrated Circuit
TRANSISTORS		
Q101, 102	2SC2787L	Transistor
Q103～105, 403, 404, 702, 703	2SC3311－Q	Transistor
Q401	2SC1685－QNC	Transistor
Q402, 704, 705, 907	2SA1309Q	Transistor
Q902, 903	2SC2785F	Transistor
Q701	2SC1384A－R	Transistor
DIODES		
D201	KV1260Z	Diode
D401	LN846RP	L.E.D.
D402～404	LN446YP	L.E.D.
D405～407, 901～904, 909, 911, 914, 915, 917, 920～924, 926	MA165	Diode
D701, 702 ⚠	1SR35200	Rectifier
D703	MA4150M	Diode
D704	MA4062M	Diode
D912, 913	MA162A	Diode
D927	MA29WA	Diode
D950	MA4100M	Diode
COILS		
L101	SLM1B10－M	Choke
L201, 202	ELEPK1R0MA	Choke, 1μH
L204	SLO2B7－M	MW OSC
L205	SLA2B1－1M	LW Antenna
L301, 302	SLM5B2－1P	Choke
L303	ELEBH1R0MA	Choke
L304	ELEBY1R0MA	Choke
L305, 306	ELEPK1R0MA	Choke, 1μH
L307	ELEPK1R0MA	Choke, 1μH
L308	ELEPH1R0MA	Choke, 1μH
L901	ELEPKR22MA	Choke
L902	ELEPK1R2MA	Choke, 1.2μH
TRANSFORMERS		
T101	SLI4B511－Z	FM IFT

Ref. No.	Part No.	Description
TRANSFORMERS		
T102	SLI4B513－Z	FM IFT
T201	SLI2B101－M	AM IFT
CERAMIC FILTERS		
CF101, 102	SVFE107MS2－A	FM, 10.7MHz (Red)
	SVFE107MS2－D	FM, 10.65MHz (Black)
	SVFE107MS2－E	FM, 10.75MHz (White)
CF201	SVFSFZ450F7L	AM, 450kHz
CRYSTAL		
X901	SVQ49U452－T	4.5MHz Counter OSC
COMPONENT COMBINATIONS		
Z1	SLA4Z13－Z	ANT. FILTER
Z301, 302	EXRP102K473C	1000pF, 47kΩ
VARIABLE RESISTOR		
VR302	QVNB3A00B472	FM MPX VCD Adj.
VARIABLE CAPACITOR		
CT202	ECRHA010A41	LW Antenna
LIQUID CRYSTAL DISPLAY		
LCD	SALHLC9225－6	LCD
FM FRONT END		
	SNVFE306G19	FM Front End Pack
LAMP		
PL1	XAMS15S150	Lamp
SWITCHES		
S1	SSH1196	Power Switch
S2～15	SSG13	Preset, Band Selector, FM Mode, Tuning, Memory

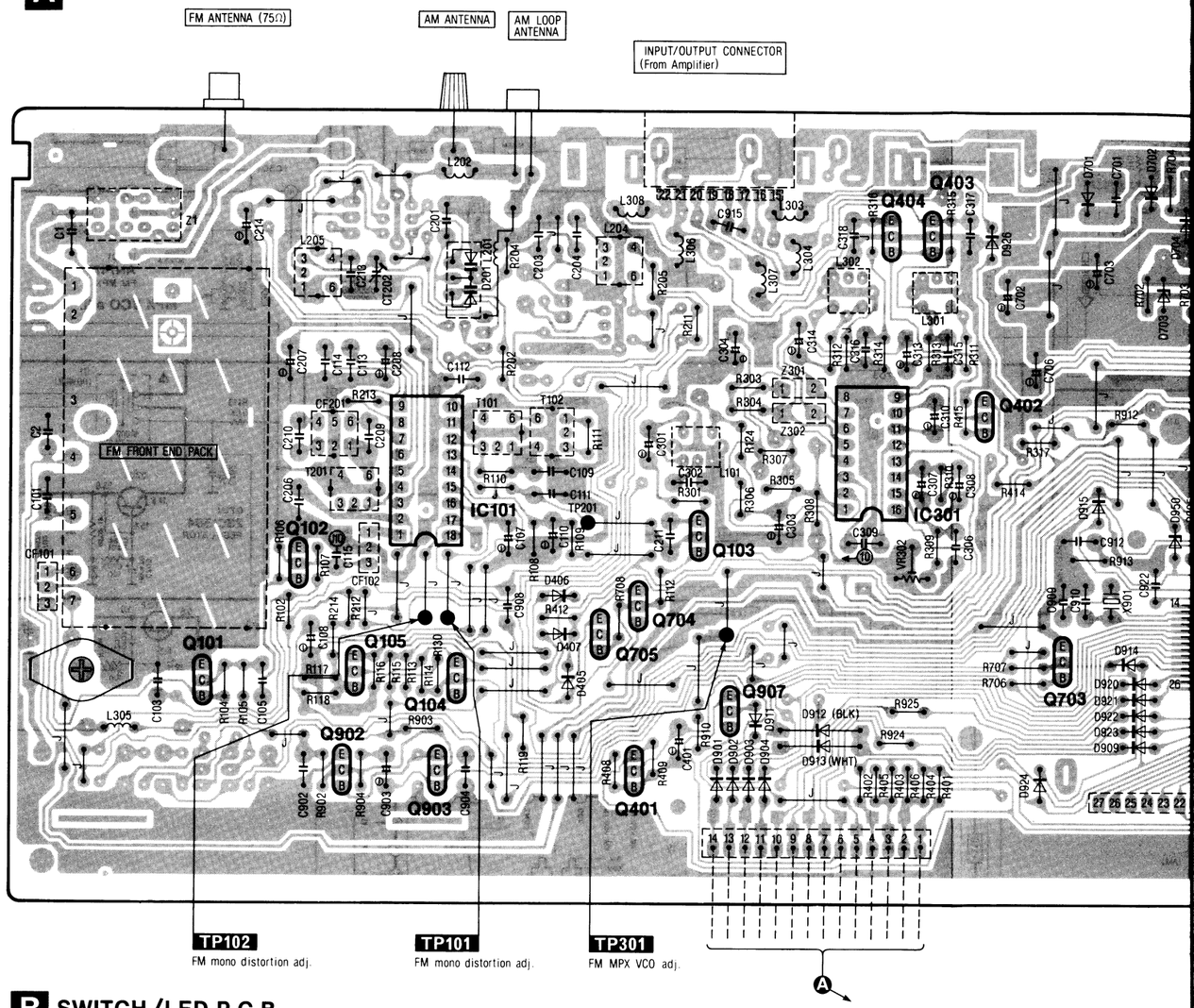
Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
1	SGYTZ990－KE	Front Panel Ass'y	(1)
〔1-1	〔SDU293B	Transparent Plate	(1)
2	SBC814－1	Preset Button	(1)
3	SBCTS75－KM	Selector Button Ass'y	(1)
4	SBC666－3	Power Button	(1)
5	SBC815－1	Tuning Button	(1)
6	SHR415	Nylon Pin	(1)
7	SDU296A	Filter	(1)
8	SMP409	Lamp Case	(1)
9	SHE170－1	Spacer	(2)
10	SKC1930K99	Cabinet	(1)
11	SJF8302N	Terminal Board	(1)
13	SGPTZ990－KG	Rear Panel Ass'y	(1)
〔13-1	〔SKL297－1	Foot	(4)
14	SHR9798	L.E.D. Case	(1)
15	SWK1664	Cord	(1)
16	SJS804	Terminal (8 Pin)	(1)
SCREWS			
N1	XTB3+8G	Tapping, ⊕3×8	(1)
N2	XTBS3+12F1	Tapping, ⊕3×12	(2)
N3	XTBS3+8JFZ1	Tapping, ⊕3×8	(9)
N4	XTWS3+10Q	Tapping, ⊕3×10	(1)
ACCESSORIES			
A1	SSA270M	FM Antenna Cord	(1)
A2	SPB1139	Loop Antenna	(1)
A3	SPB1141－2	Bracket	(1)
A4	SQF12795	Instruction Book (Include SU-Z990)	(1)
PACKING PARTS			
P1	SPG5716	Carton Box	(1)
P2	SPS4717	Pad, Left Side	(1)
P3	SPS4718	Pad, Right Side	(1)
P4	SPS4755	Pad	(1)
P5	SPP711	Polyethylene Bag	(1)

■ EXPLODED VIEW ([ ]Addition from ST-Z990/L)

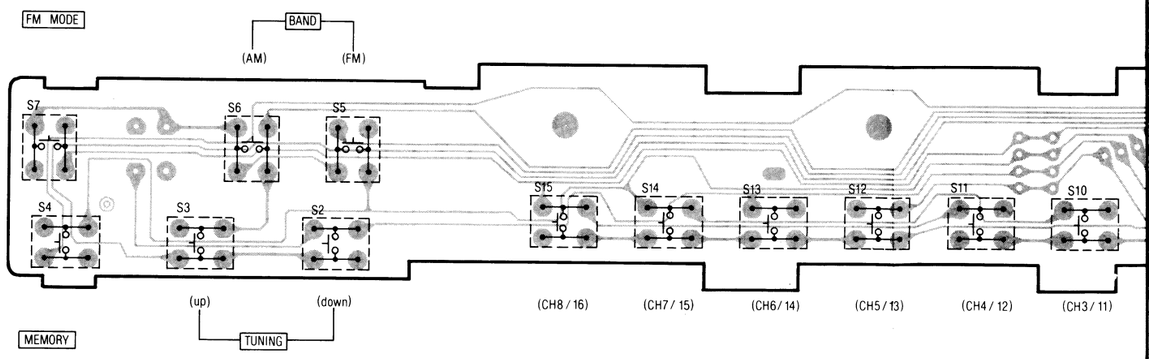


■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

A MAIN P.C.B.



B SWITCH/LED P.C.B.

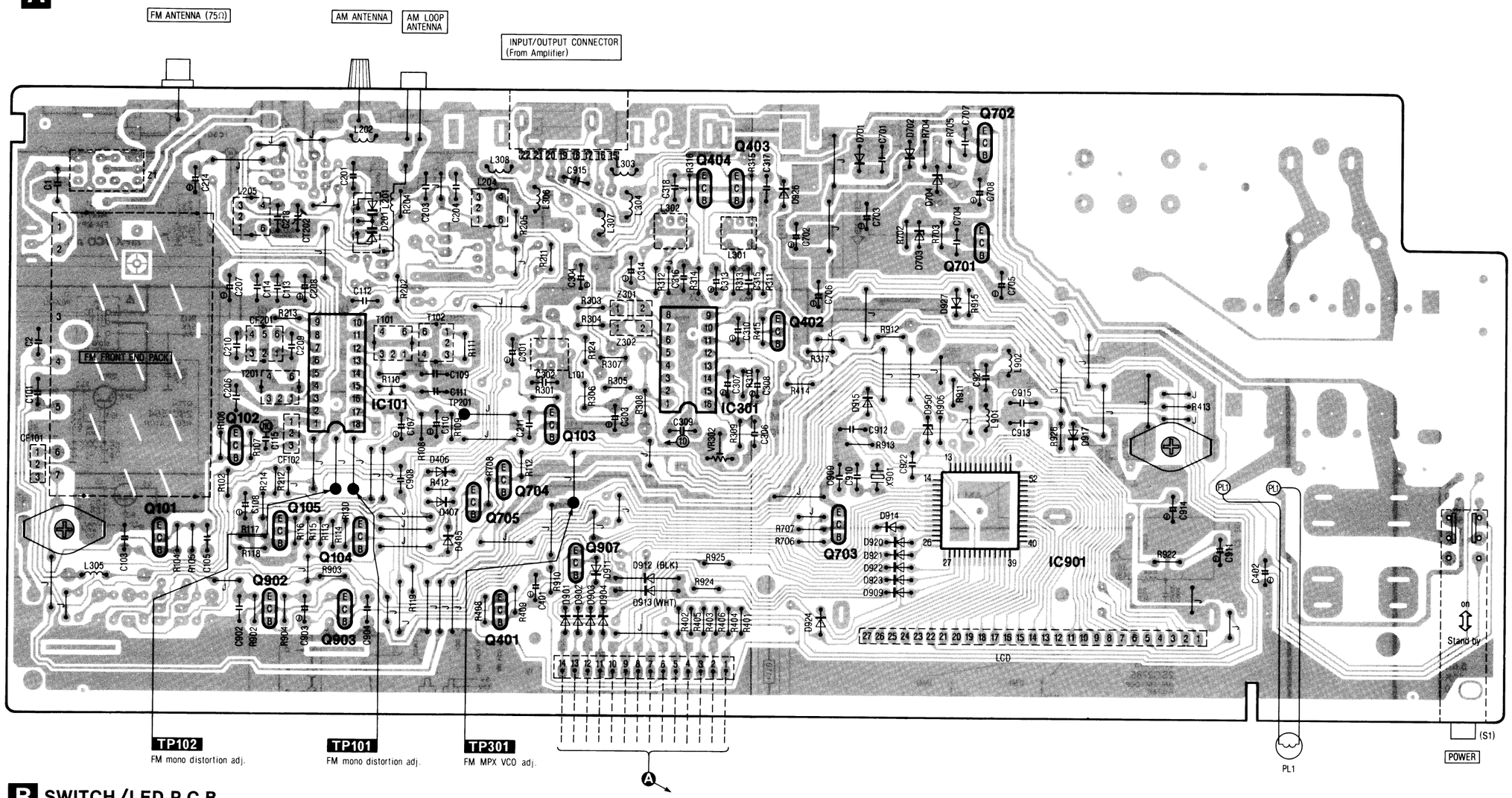


of

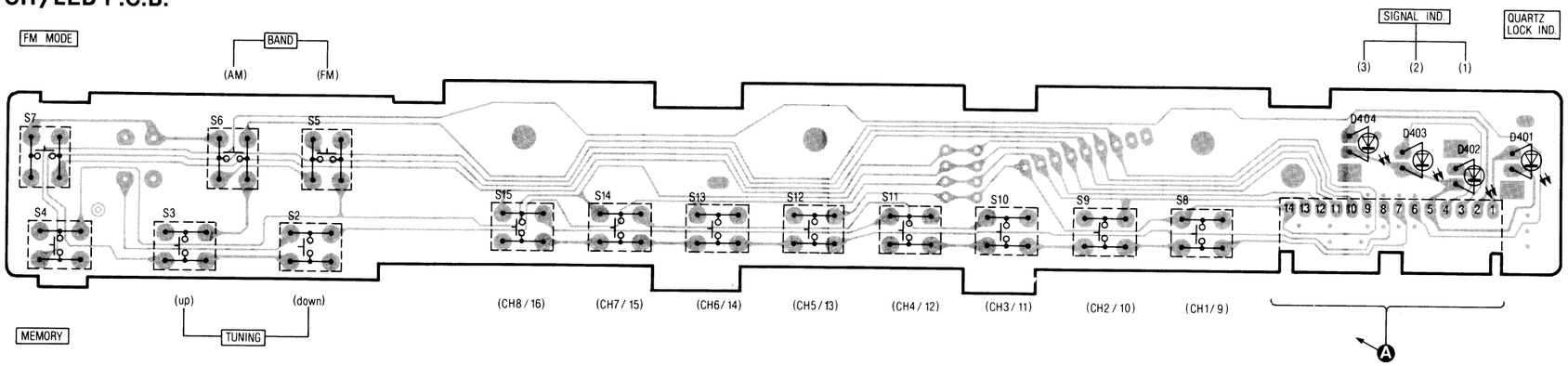
Description	
PARTS	
Front Panel Ass'y	(1)
Transparent Plate	(1)
Preset Button	(1)
Selector Button Ass'y	(1)
Power Button	(1)
Tuning Button	(1)
Nylon Pin	(1)
Filter	(1)
Lamp Case	(1)
Spacer	(2)
Cabinet	(1)
Terminal Board	(1)
Rear Panel Ass'y	(1)
Foot	(4)
L.E.D. Case	(1)
Cord	(1)
Terminal (8 Pin)	(1)
Tapping, ⊕3×8	(1)
Tapping, ⊕3×12	(2)
Tapping, ⊕3×8	(9)
Tapping, ⊕3×10	(1)
FM Antenna Cord	(1)
Loop Antenna	(1)
Bracket	(1)
Instruction Book (Include SU-Z990)	(1)
Carton Box	(1)
Pad, Left Side	(1)
Pad, Right Side	(1)
Pad	(1)
Polyethylene Bag	(1)

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

A MAIN P.C.B.



B SWITCH/LED P.C.B.



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Service Manual

Tuner

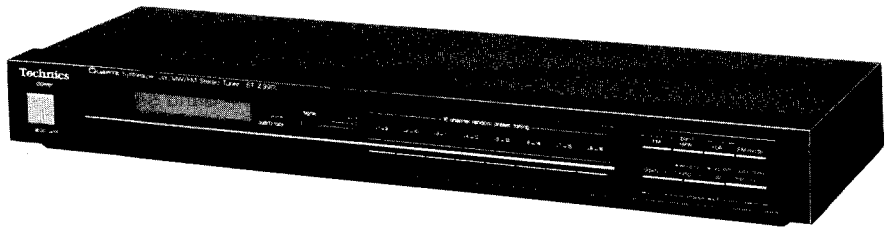
QUARTZ Synthesizer AM/FM Stereo Tuner (ST-Z990)

QUARTZ Synthesizer LW/MW/FM Stereo Tuner (ST-Z990L)

ST-Z990
ST-Z990L

Color

(K)...Black Type



* This photo is **ST-Z990L**.

Color	Areas
(K)	[EX]....Continental Europe. (ST-Z990)
(K)	[EK]....United Kingdom. (ST-Z990L)
(K)	[EB]....Belgium. (ST-Z990L)
(K)	[EH] ...Holland. (ST-Z990)
(K)	[EF]....France. (ST-Z990L)
(K)	[EW]...Switzerland. (ST-Z990L)
(K)	[Ei].....Italy. (ST-Z990)
(K)	[XA]....Asia, Oceania, Latin America, Middle Near East and Africa. (ST-Z990)
(K)	[XL]....Australia. (ST-Z990)

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.5~108.00MHz (0.05MHz step)
Sensitivity	
S/N 30dB	1.3μV (75Ω)
S/N 26dB	1.2μV (75Ω)
S/N 20dB	0.9μV (75Ω)
IHF usable sensitivity	1.5μV/75Ω (IHF '58)
IHF 46dB stereo quieting sensitivity	22μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	70dB (78dB, IHF '58)
STEREO	65dB (70dB, IHF '58)
Frequency response	20Hz~15kHz, +0.5dB~−1.5dB
Alternate channel selectivity	
normal ±400kHz	65dB
Capture ratio	1.0dB
Image rejection at 98MHz	40dB
IF rejection at 98MHz	70dB
Spurious response rejection at 98MHz	70dB
AM suppression	55dB
Stereo separation	
1kHz	40dB
10kHz	30dB
Carrier leak	
19kHz	−30dB (−35dB, IHF)
38kHz	−45dB (−50dB, IHF)
Channel balance (250Hz~6,300Hz)	±1.5dB
Limiting point	1.2μV
Bandwidth	
IF amplifier	180kHz
FM demodulator	1000kHz
Antenna terminals	75Ω (unbalanced)

■ AM (MW) TUNER SECTION

Frequency range	522~1611kHz (9kHz-steps) 530~1620kHz (10kHz-steps)
Sensitivity (S/N 20dB)	20μV, 300μV/m
Selectivity (±9kHz)	55dB
Image rejection at 999kHz	40dB
IF rejection at 999kHz	60dB

■ LW TUNER SECTION (ST-Z990L only)

Frequency range	155~353kHz 153~351kHz (−2kHz shift)
Sensitivity (S/N 20dB)	50μV
Selectivity (at 254kHz)	55dB
Image rejection at 254kHz	40dB
IF rejection at 254kHz	60dB

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ GENERAL

Output voltage	0.3V (0.6V, IHF)
Power consumption	9W
Power supply	AC 50Hz/60Hz, 8.6V
Dimensions (W×H×D)	430×53×150mm (16-15/16"×2-2/32"×5-28/32")
Weight	1.1kg (2.4lb.)

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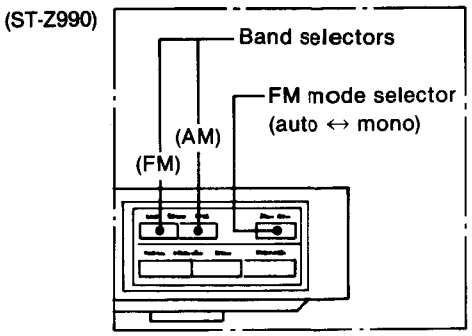
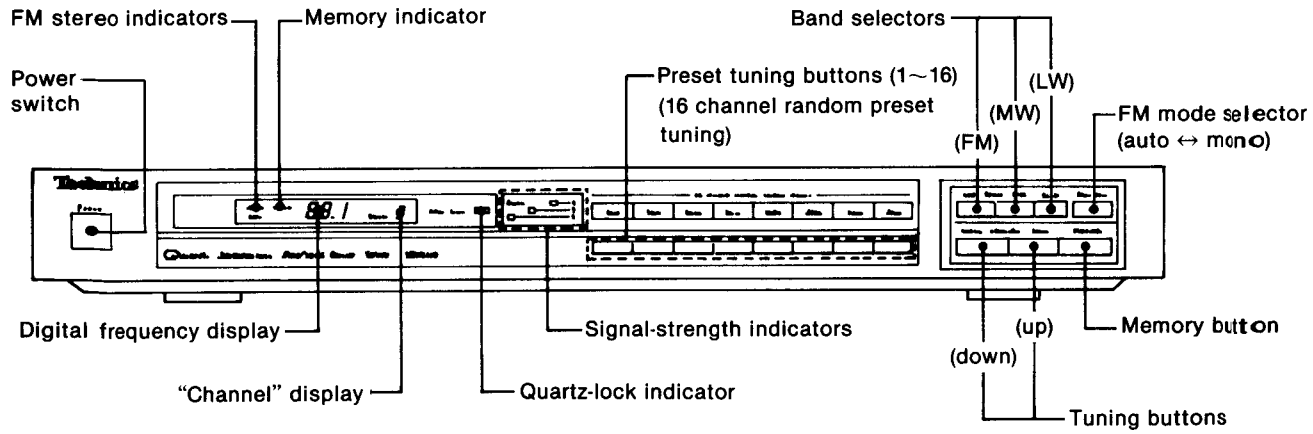
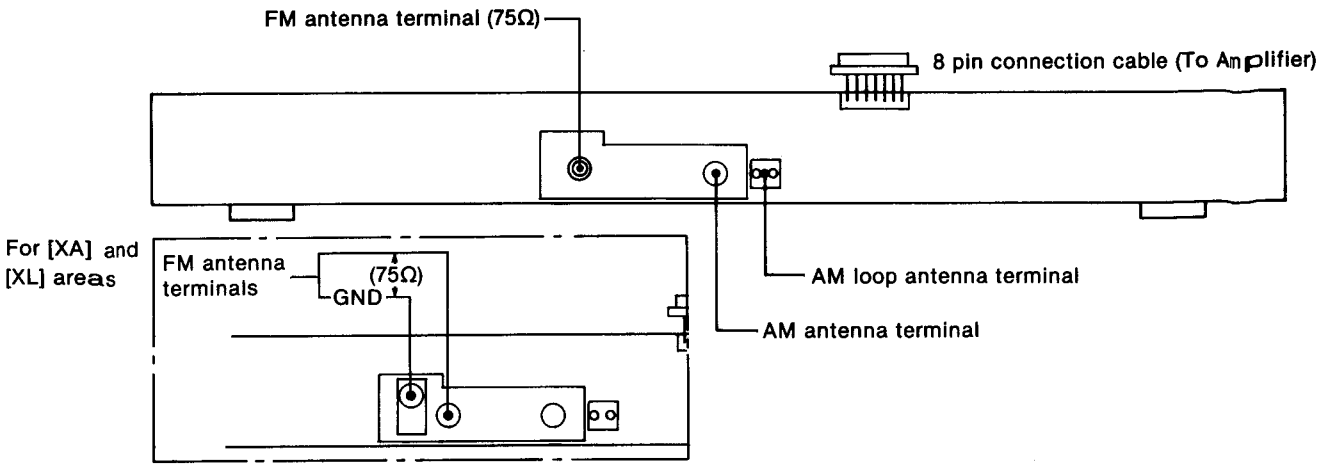
■ LOCATION OF CONTROLS

• Front panel (ST-Z990L)





• Rear panel

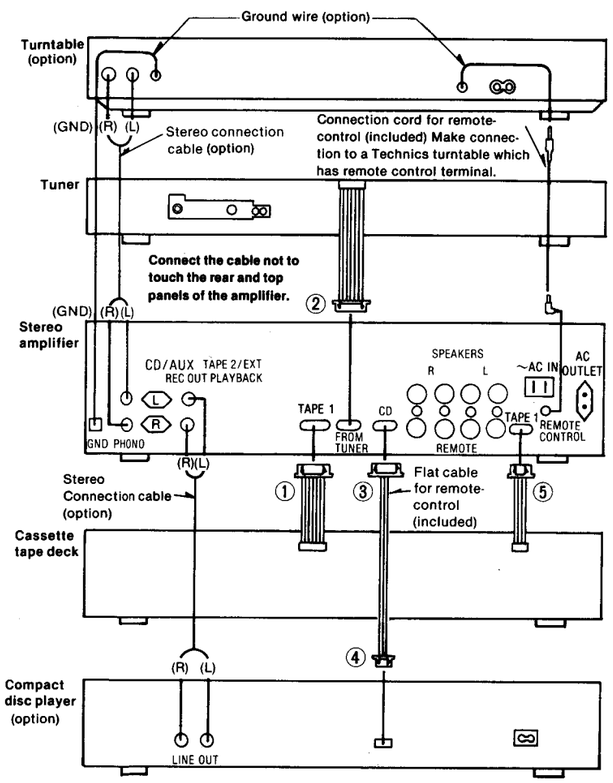


■ HOW TO CONNECT

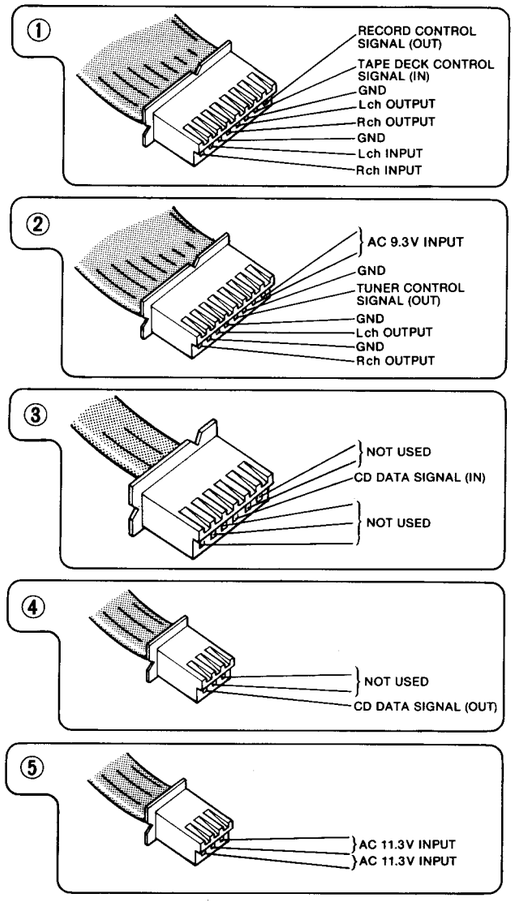
Connect the turntable, tuner, amplifier, cassette deck, and CD player as shown.

If the connection is wrong, normal operation will not be attalbed.

Tuner (ST-Z990/Z990L) and Cassette deck (RS-D225W) is not equipped with power supply. So, the amplifier shown or power supply JIG is necessary for the repair and check of Tuner or Cassette deck.

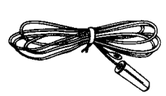


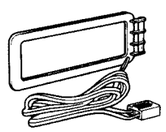
※ Flat cables for remote-control should be connected correctly. If connections are wrong, the units do not function correctly.



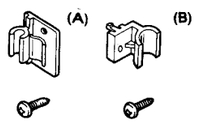
■ ACCESSORIES

- FM indoor antenna 1
- AM loop antenna 1
- Slip-stop angles 2



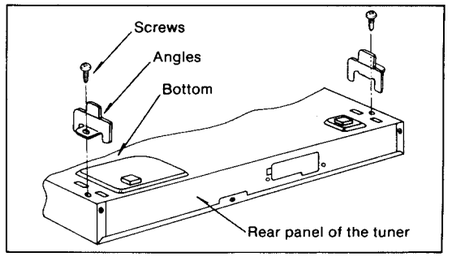


- AM antenna holders 2
- Attachment plug ..... 1 (For United Kingdom only)



How to use the slip-stop angles

If there is a problem of the tuner on the amplifier sliding backward during use, attach the included angles (see below).



■ ANTENNA CONNECTIONS

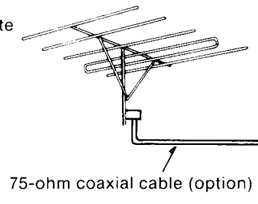
The indication AM used here includes both MW and LW for Model ST-Z990L.

Antenna connections

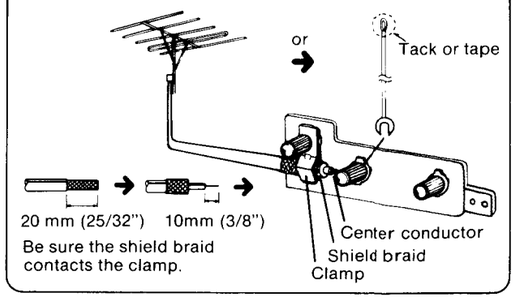
Note: An outdoor antenna should be installed by a competent technician only.

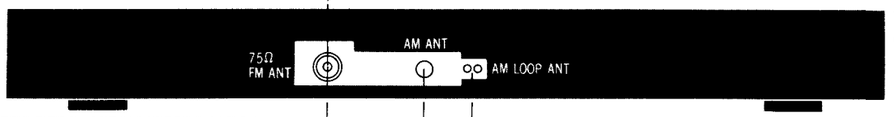
FM outdoor antenna (option)

(Necessary in mountainous regions, inside reinforced-concrete buildings, etc.)



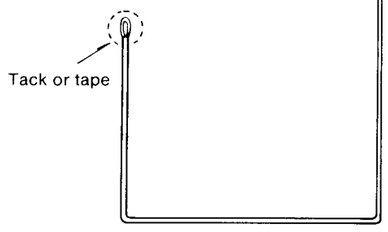
If FM antenna terminal is as shown below



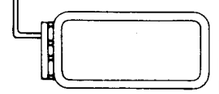


FM indoor antenna (included)

- Attach to a wall (using tack or tape) facing in direction of best reception.
- Tack should not contact internal antenna wire.
- For best reception sound quality, an FM outdoor antenna is recommended.
- Disconnect this antenna if an FM outdoor antenna is installed.



AM loop antenna (included)



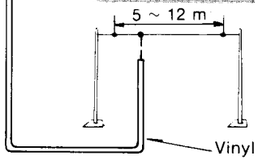
After finding the best reception position for the antenna, fix it to a wall, the rack, or the amplifier, etc.

Note:

If this antenna is not properly installed, AM broadcasts will not be received.

Be sure to connect the AM loop antenna even when an outdoor antenna is used.

AM outdoor antenna (option)



(Necessary in mountainous regions, inside reinforced-concrete buildings, etc.)

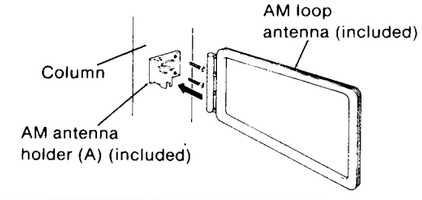
Use 5 ~ 12 m (16 ~ 40 ft.) of vinyl-covered wire horizontally at the window.

Installation of the AM loop antenna

1. Pay attention to the following points when attaching the antenna.
   - Do not attach it horizontally (to do so would impair reception).
   - Do not attach it close to metal surfaces (to do so would result in noise).
   - Do not attach it close to power cords, speaker wires, etc. (to do so would result in noise).
   - Do not attach it close to a tape deck (when the tape deck is being used, chirping or beeping sounds may be received).
2. Connect the AM loop antenna to the AM antenna terminals located on the rear panel of the tuner.

When attaching the antenna to a wall, column or rack

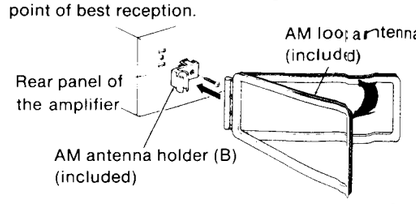
Find the height and direction of the antenna where reception is best and then fix it vertically to the wall, rack, etc.



When attaching the antenna to the amplifier

This type of installation may cause impaired reception or result in signal noise. If possible, attach the antenna to the rack, a wall, or a column.

Move the antenna toward the right or left to find the point of best reception.



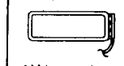
■ MEMORY PRESETTINGS

With ST-Z990/ST-Z990L you may preset as many as 16 radio broadcast stations: FM/AM random presetting. After broadcast stations have been preset as described below, any desired station can be quickly and easily selected by simply touching one button.

Note:
If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.

The indication AM used here includes both MW and LW for Model ST-Z990L.

Important!


AM loop antenna

If this antenna is not installed, AM broadcasts will not be received.

Automatic memory presetting

ST-Z990 The FM broadcasting stations and AM broadcasting stations will be automatically preset to "channels" 1 through 16 for FM and 9 through 16 for AM, respectively.

Note: When AM is automatically preset, the FM stations on "channels" 9 through 16 will be replaced by the new AM stations.

ST-Z990L The FM broadcasting stations, MW broadcasting stations, and LW broadcasting stations will be automatically preset in "channels" 1 through 16 for FM, 9 through 16 for MW, and 13 through 16 for LW, respectively.

Note: When MW is automatically preset, the FM stations on "channels" 9 through 16 will be replaced by the new MW stations.
When LW is automatically preset, the MW stations on "channels" 13 through 16 will be replaced by the new LW stations.

Have you completed the "Standard Operating Procedures"?

1 Power: "on" (→)

3 Set to the lowest frequency.

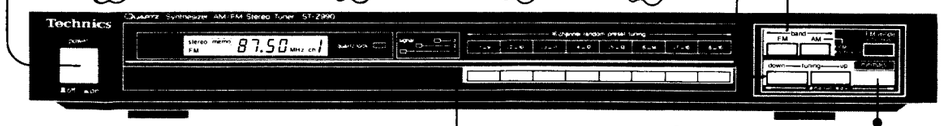
ST-Z990
- **FM: 87.50 MHz**
- **AM: 522 kHz** (9 kHz step) **or 530 kHz** (10 kHz step)

ST-Z990L
- **FM: 87.50 MHz**
- **MW: 522 kHz** (9 kHz step) **or 530 kHz** (10 kHz step)
- **LW: 153 kHz** (–2kHz shift) **or 155 kHz**

① Press the button and hold slightly (frequency will change continuously).
② Release it when approaching the above exact frequency, and then press the button again momentarily (frequency change will stop).
③ Press the button momentarily (frequency will change each time the button is pressed), and tune to one of the above frequencies.

2 ST-Z990
"FM": for FM broadcasts
"AM": for AM broadcasts

ST-Z990L
"FM": for FM broadcasts
"MW": for MW broadcasts
"LW": for LW broadcasts
Before presetting the broadcasting stations, press to select the appropriate frequency step for your locality.



4 Press. When the frequency indication begins to change, release.

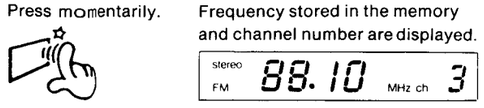
The frequency will change upward, and the automatic presetting will begin with the next broadcasting station.
It will continue to preset consecutive broadcast stations.

Notes:
1. For automatic presetting in areas where there are less than 16 FM stations, the remaining channels (through channel 16) will be left empty. The empty channels can be filled by using manual memory presetting.
2. For AM broadcasts with extremely strong signal transmissions, the frequency memorized may be slightly different from the correct frequency. If this occurs, use the manual control to memorize.

5 Confirm the names (call signs, etc.) of the broadcasting stations which are preset to each channel, and enter them on the file sheet.

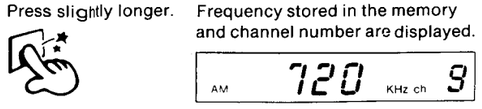
To check the front channels (CH 1~ 8):

Press momentarily. Frequency stored in the memory and channel number are displayed.



To check the back channels (CH 9~ 16):

Press slightly longer. Frequency stored in the memory and channel number are displayed.



■ "Most-recent" memory

The most-recent memory is a system by which the unit "remembers" the FM or AM broadcast station last heard when this unit is turned off, and automatically tunes to that station the next time the power is turned on.

■ "Back-up" memory

This is the function which preserves the preset memory and most-recent memory functions. In the event of a power failure, or if the power cord of the amplifier is disconnected from the electric outlet, the back-up memory will preserve the preset memory and most-recent memory functions for as long as approximately one week.

To prevent erasing the memory

If the power supply is interrupted for one week or longer, the memory settings will be erased.
For example:
1) If the power cord of the amplifier is disconnected from the electric outlet,
2) If an audio timer is used and the timer does not operate the tuner for a week or longer,
3) If a power failure occurs, etc.

If any of the above occurs, the memory will have to be reset.
If the power supply is interrupted for a week or longer, set the power switch of the amplifier to the "on" position for sixty minutes or more. Then reprogram the memory.

Manual memory presetting

Stations can be freely preset to any desired channel.

Have you completed the "Standard Operating Procedures"?

1 Power: "on" (→)

3 Press the appropriate tuning button to tune to the desired broadcast.

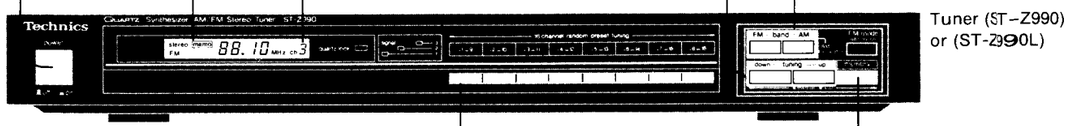
Tuning
Press the left button to change the frequency downward, and press the right button to change the frequency upward.

- **Automatic tuning**
  Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.
- **Manual tuning**
  Press the button momentarily and tune to the desired station. The frequency will change each time the button is pressed.

2 ST-Z990
"FM": for FM broadcasts
"AM": for AM broadcasts

ST-Z990L
"FM": for FM broadcasts
"MW": for MW broadcasts
"LW": for LW broadcasts
Before presetting the broadcasting stations, press to select the appropriate frequency step for your locality.

Memory indicator
Channel display



5 While the memory indicator is illuminated, press the button of the desired channel.

When the button is pressed, the memory indicator illumination will stop, and the presetting is complete.

- **To preset channels 1 through 8:**
  Press the appropriate button and then release. (Preset channel number is displayed on the channel display.)
- **To preset channels 9 through 16:**
  Press the appropriate button slightly longer, and then release. (Preset channel number is displayed on the channel display.)

Note:
If the memory indication illumination stops before you press the button, once again repeat step 4 and then step 5.

4 Press momentarily, and then release.

(The memory indicator will illuminate for approximately 4 seconds.)

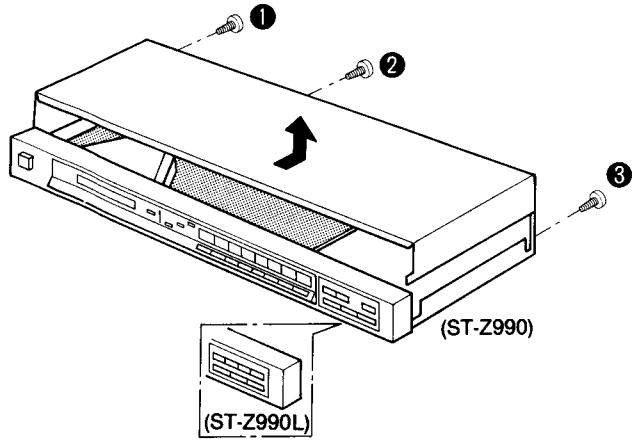
Note:
If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically.
To stop the automatic memory presetting, once again press either the "up" button or the "down" button.

6 Enter the name (call sign, etc.) of the preset broadcasting station on the station memory file sheet.

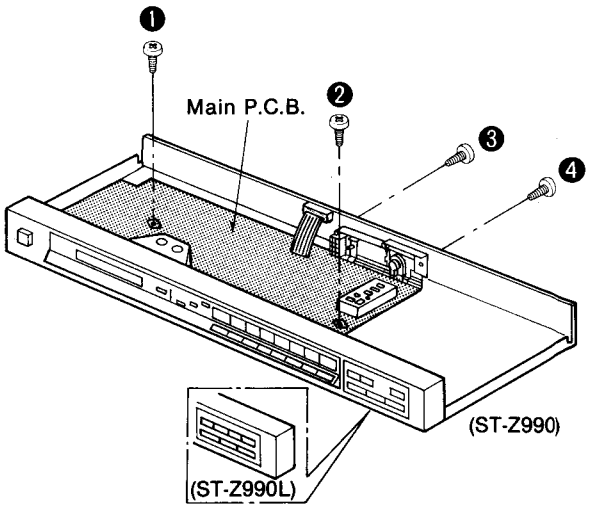
This completes the procedures for presetting radio broadcast frequencies. The other preset-tuning buttons can be preset in the same way by following step 2 through 5.

■ DISASSEMBLY INSTRUCTIONS

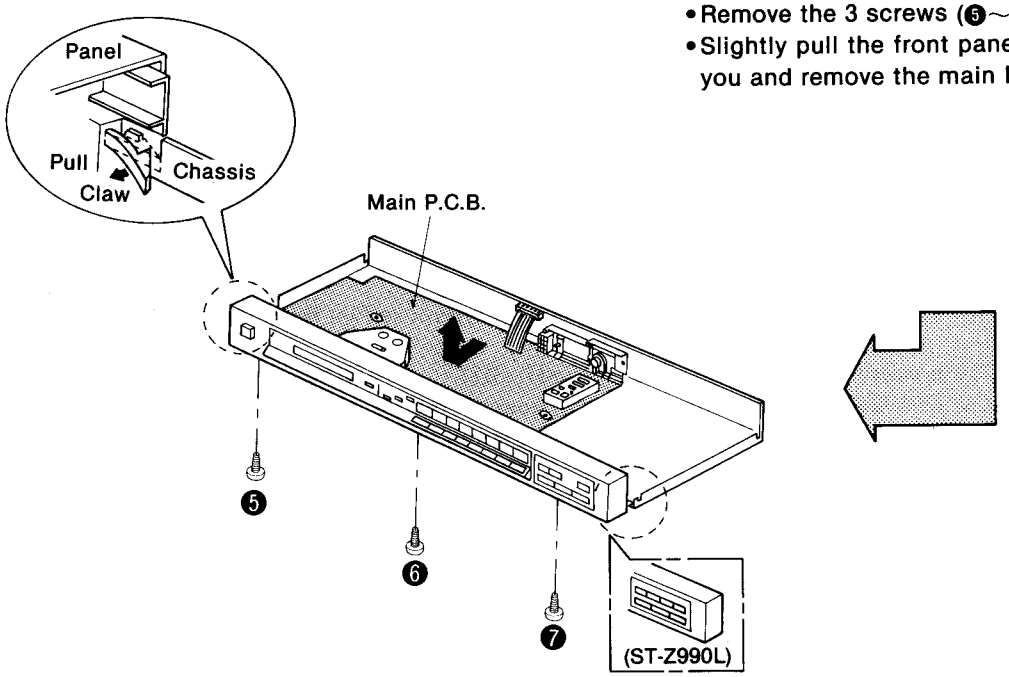
Ref. No. 1	How to remove the cabinet
Procedure 1	• Remove the 3 screws (❶~❸).



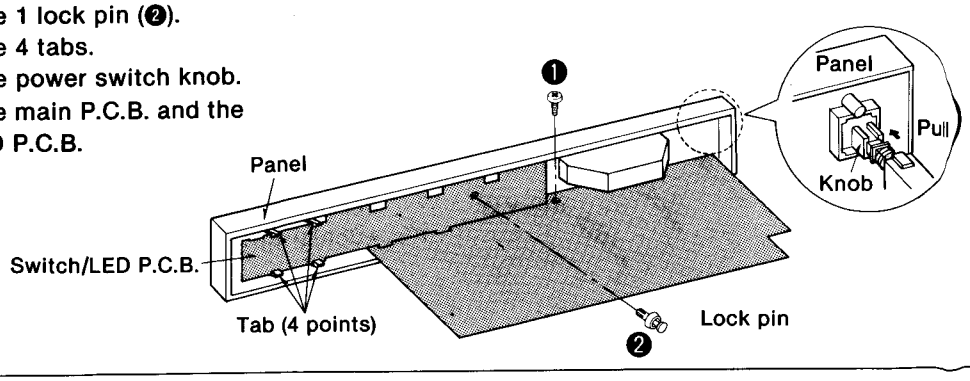
Ref. No. 2	How to remove the main P.C.B.
Procedure 1 → 2	• Remove the 4 screws (❶~❹).



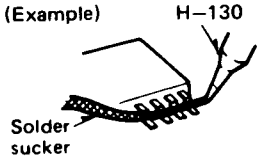
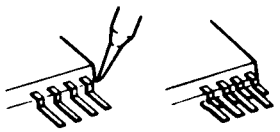
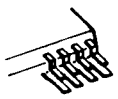
• Remove the 3 screws (❺~❼).
• Slightly pull the front panel toward you and remove the main P.C.B.



Ref. No. 3	How to remove the front panel
Procedure 1 → 2 → 3	• Remove the 1 screw (❶). • Remove the 1 lock pin (❷). • Remove the 4 tabs. • Remove the power switch knob. • Remove the main P.C.B. and the switch/LED P.C.B.



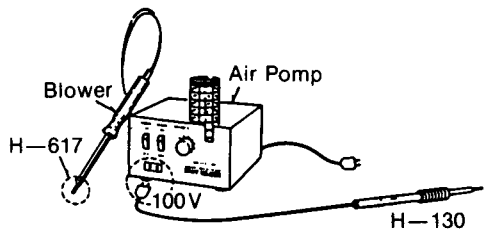
■ HOW TO REPLACE IC'S (Small outline type)

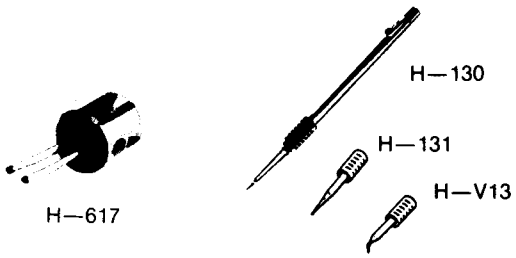
Replacing procedure			Cautions
1	Reduce the amount of solder on each pin of the integrated circuit by use of a solder sucker.	(Example) H—130 	• Recommended tool .....Special soldering iron * H605M and H-130. * H605E and H-130. • Do not touch the soldering iron to the area for a long time. It may otherwise cause removal of the print foil. • When shifting the pin upward, do the job quickly while the solder is melting. If the solder is hard, it may cause removal or breakage of the print foil. • When using a pencil type soldering iron. 1. Completely remove the solder from each IC pin by use of solder sucker. 2. Raise each pin by means of an eyeleteer, hold the pliers then remove IC package from P.C.B.
2	Melt the solder on the pin (one electrode) with the soldering iron.		
3	While the solder is melting, shift the pin upward by the soldering iron to remove it from the foil.		
4	Remove each pin from the foil according to the above-mentioned procedure.		

*** Special soldering iron**
(Refer to Technical Information, ORDER NO. GAD84125486T1)...For U.S.A. and Canada
(Refer to Technical Information, ORDER NO. GAD84115476T8)...For others

•H—605 Spot Heater (hot-air solder iron)
This device that uses hot air to melt solder was developed to remove Flat-Pakage ICs, RHCs and chip parts.

- H—605M (For 120V power source)
- H—605E (For 200V/220V/240V power source)





•H—617 Twin Nozzle (for spot heater)
Special nozzle for the removal of RHCs and chip resistors. (Nozzle diameter: 1.0mm×2)

•H—130 Slim Pencil Solder Iron
An ultrasmall ceramic heater solder iron is extremely handy for soldering chip parts, RHCs, ICs etc., to high-density circuit boards.
Features:

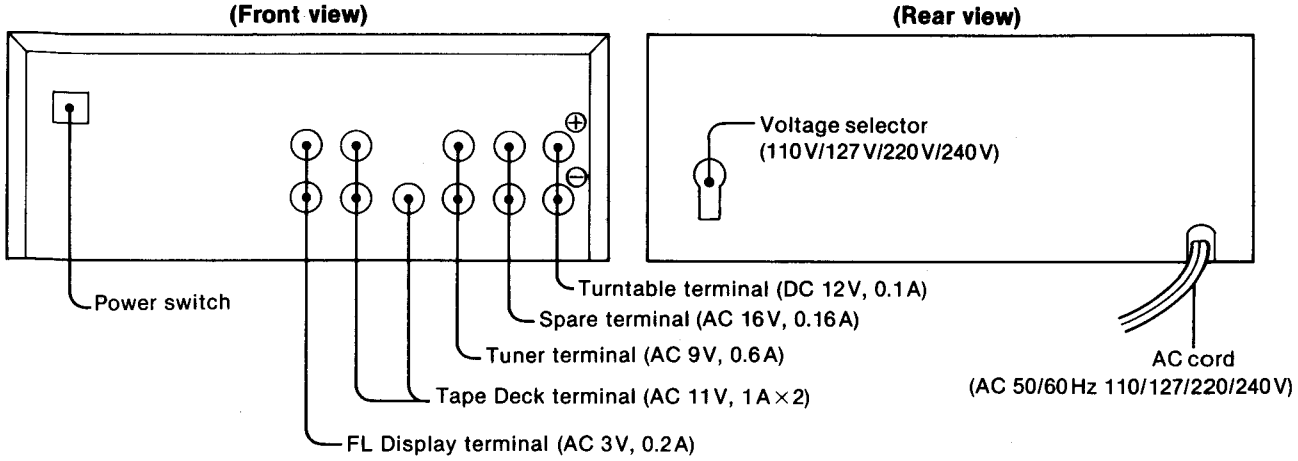
• Rated power:	100V, 15W
• Max. temp.:	400°C
• Heater:	ceramic (long life)
• Insulation resistance:	100MΩ
• Length:	178mm
• Weight:	16g (not including cord)

•H—131, H—V13 Cap Bits
Solder tip for the slim pencil Solder Iron and is composed of a bit holder and a corrosion resistance solder tip.
Permits changing of solder tips even while still hot.

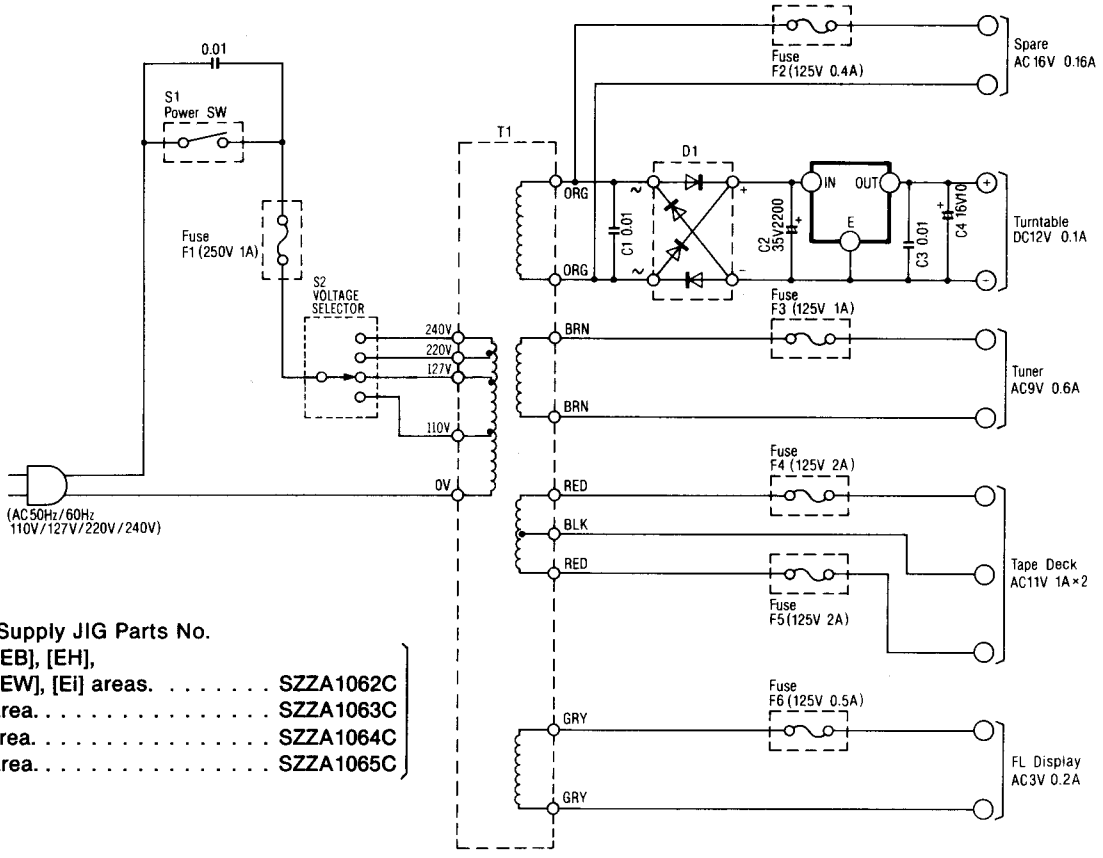
• Solder tip:	0.3mm

■ INFORMATION ON POWER SUPPLY JIG

• LOCATION



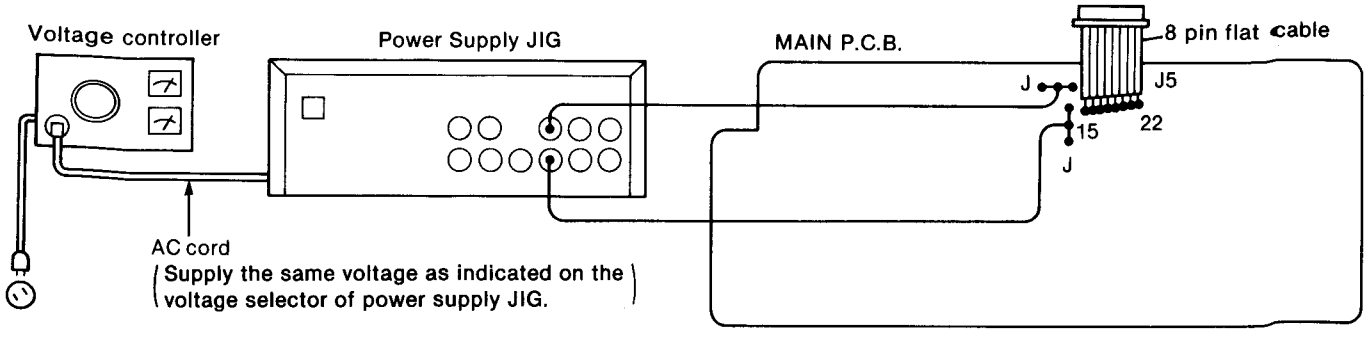
• SCHEMATIC DIAGRAM (Reference)



※ Power Supply JIG Parts No.

- [EX], [EB], [EH], [EF], [EW], [Ei] areas. SZZA1062C
- [EK] area. SZZA1063C
- [XL] area. SZZA1064C
- [XA] area. SZZA1065C

• HOW TO CONNECT



■ FUNCTION OF TERMINAL (PLL controller IC901: μPD1718G514)

PIN NO.	IN/OUT	MARK	DESCRIPTION OF TERMINAL
1 ~ 4, 34 ~ 52	OUTPUT	LCD4 ~ LCD1, LCD23 ~ LCD5	Segment signal output terminal for display.
5	OUTPUT	COM2	Common signal output terminal connected to LCD. Output is delivered in 3 values of ground, 1/2V_{DD} and V_{DD} (at 5ms intervals) in a period of 50Hz. The segment turns ON when the difference in voltage is $\pm V_{DD}$ between these terminals and LCD1~LCD23.
6		COM1	
7	INPUT	V_{DD}	Power supply terminal of device. Voltage of 5V±10% is supplied during operation of device. To hold the internal date memory (RAM), the voltage can be decreased to 2.5V. **Note:** Pins 7 and 33 are connected inside the chip. It is unnecessary to supply voltage to the pins.
33		V_{DD}	
8	INPUT	FM	Input is local oscillator output (VCO) in a range of 10~130MHz (0.3Vp-p, min.). There are 1/2 fixed frequency division prescaler and 2-step (1/32, 1/33) prescaler internally. Therefore, when deciding the frequency dividing value of programmable divider, it must be decided from the frequency obtained by halving the local oscillator output (VCO).
9	INPUT	AM	Input is local oscillator output (VCO) in a range of 0.5~20MHz (0.1Vp-p, min.). When the mode is shifted to FM, the AM terminal voltage automatically becomes the supply voltage of device.
10	———	GND	Ground terminal.
11	OUTPUT (ST-Z990L only)	E01	When the divided oscillator frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
12	OUTPUT	E02	
13	INPUT	CE	Device selection signal input terminal. The signal level should be high when the device is operated, and low when not operated. With this terminal shifted to low level, LCD (liquid crystal display) turns off and the memory is held.
14	———	NC	Not used in this unit.
15	OUTPUT	X1	Connecting terminal for crystal oscillator. The crystal connected is 4.5MHz.
16	INPUT	X2	
17	INPUT	SD	Terminal to put in stop signal during auto tuning. The voltage is 5V with broadcast received, and 0V without broadcast received.
18	INPUT	REMOTE CONTROL	This is the interrupt demand signal input terminal. The signal from the control input terminal is put into this terminal, demanding for interruption, then the flow of program will be unconditionally shifted to the address No. 1.
19	OUTPUT	FM	FM/AM output terminal. (FM → 5V, AM → 0V)
20	OUTPUT	LW/FM MONO	Auto/mono changeover output terminal. (auto → 0V, mono → 5V)
21 ~ 24	INPUT	KEY3 ~ KEY0	Input terminal for key return signal from external key matrix.
25 ~ 28	OUTPUT	PB3 ~ PB0	Output terminal for key return signal to external key matrix.
29	OUTPUT	PC3	Terminal for FM IF ceramic filter frequency compensation. A pulse is generated when the voltage of terminal 13 rises.
30	OUTPUT	PC2	Output terminal for key return signal to let the stereo indicator light up.
31	OUTPUT	PC1	Not used in this unit.
32	OUTPUT	MUTE	Muting signal output terminal. Muting signal is delivered during operation of FM/AM selector switch and tuning switch. (4V during muting)

[KEY MATRIX]

Pin No.	25	26	27	28	29
21	UP	AM (MW)	CH5/ 13	CH1/ 9	—
22	DOWN	LW	CH6/ 14	CH2/ 10	—
23	—	FM	CH7/ 15	CH3/ 11	MEMORY
24	—	FM MODE	CH8/ 16	CH4/ 12	—

LW: ST-Z990L only

■ MEASUREMENTS AND ADJUSTMENTS

■ AM/FM (ST-Z990)
LW/MW/FM (ST-Z990L)

Control positions and equipment used

- AM and FM signal generator (AM and FM-SG)
- Stereo modulator
- Distortion analyser
- Oscilloscope
- AC and DC electronic voltmeter (EVM)
- Frequency counter
- Choke coil (100μH)
- Resistor (100kΩ)
- Ceramic capacitor (200pF)

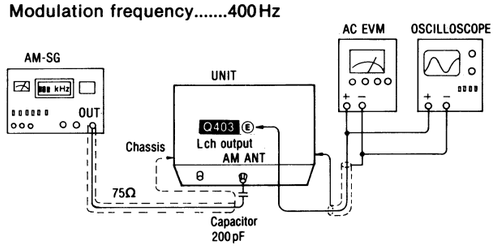
Note: For **T201** (AM-IFT) and **L204** (AM (MW) OSC coil), adjusted parts are supplied. So, do not turn the cores of this parts.

AM (MW) ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**AM (MW)**" position.
3. Place the radio dial and signal generator setting to **612kHz**.
4. Adjust **L205 (AM), L203 (MW)** for maximum output.
5. Place the radio dial and signal generator setting to **1503kHz**.
6. Adjust **CT202 (AM), CT201 (MW)** for maximum output.
7. Repeat steps 3.~6.

Note:
Antenna input level must be as low as possible being free from AGC.

AM SIGNAL GENERATOR CONDITION
Modulation 30%
Modulation frequency.....400Hz

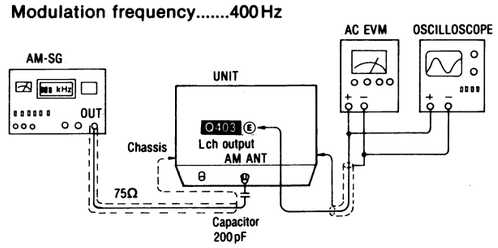


LW-RF ADJUSTMENT (ST-Z990L only)

1. Test equipment connection is shown in figure.
2. Set the unit to "**LW**" position.
3. Place the radio frequency display and signal generator setting to **155kHz**.
4. Adjust **L206** for maximum output.
5. Place the radio frequency display and signal generator setting to **353kHz**.
6. Adjust **CT202** for maximum output.
7. Repeat steps 3.~6.

Note:
Antenna input level must be as low as possible being free from AGC.

AM SIGNAL GENERATOR CONDITION
Modulation 30%
Modulation frequency.....400Hz

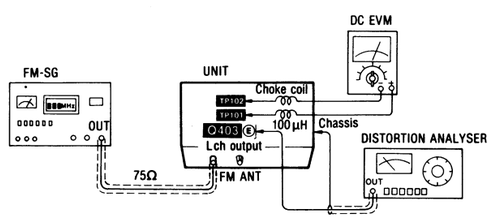


FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM**" position.
3. Place the radio frequency display and signal generator setting to **100.10MHz**.
4. Adjust **T101** core so that voltage measured in signal mode is **0mV (0±50mV)** in 1V range.
5. Adjust **T102** so that the distortion factor of Lch is minimized.
6. Repeat steps 4 and 5 a few times.
7. Make sure that the distortion factors of Lch and Rch are at minimum and nearly equal.

Note:
The adjusting screwdriver used should be made of resin.

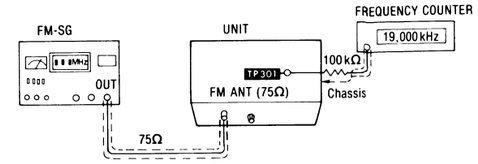
FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency.....400Hz
Output level.....66dB



MPX VCO ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM/auto**" position.
3. Place the radio dial and signal genarator setting to **100MHz**.
4. Adjust **VR302** for **19kHz±50Hz** on frequency counter reading.

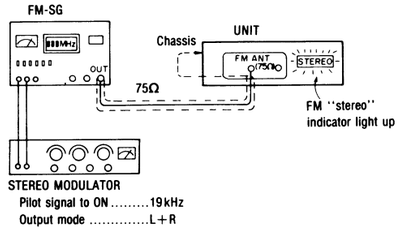
FM SIGNAL GENERATOR CONDITION
Modulation 0
Modulation frequency.....0
Output level.....66dB

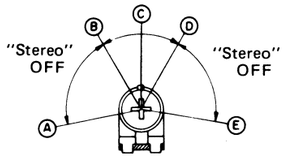


★USING ALTERNATE SYSTEM

1. Apply stereo signal from generator or receive the stereo boardcast.
2. Adjust **VR302** until stereo indicator lights up. Cement arm of **VR302** as shown in figure.

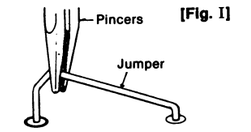
FM SIGNAL GENERATOR CONDITION
Modulation 10%
Modulation frequency.....Pilot (19kHz)
Output level.....66dB





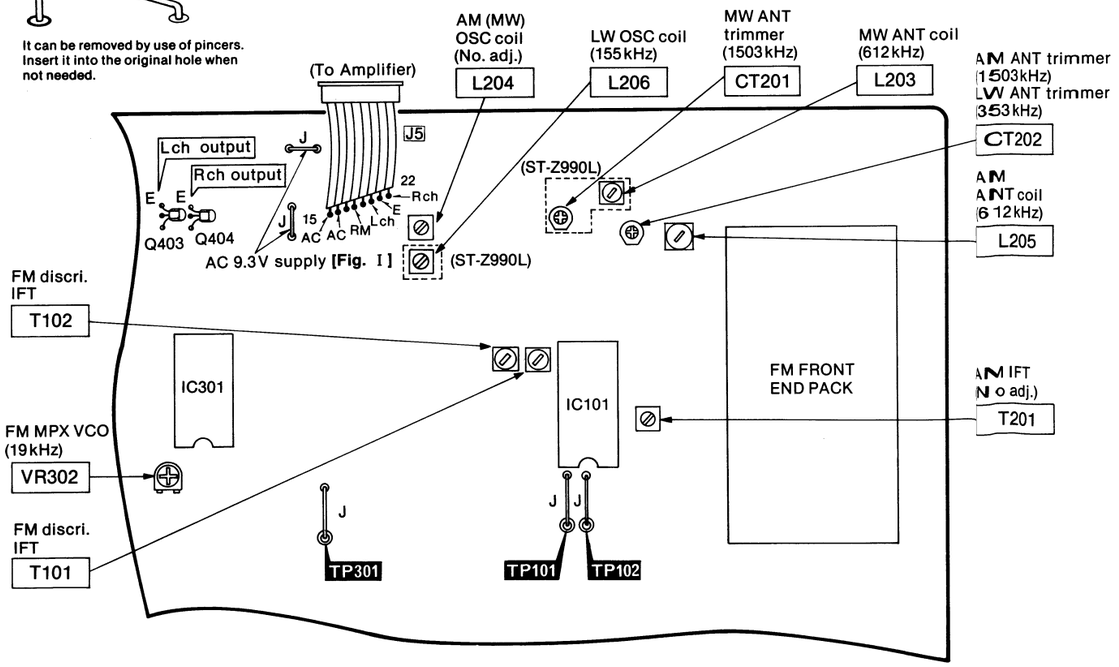
Ⓐ—Ⓑ,
Ⓓ—Ⓔ.....“Stereo” OFF position
Ⓑ—Ⓓ.....“Stereo” ON position (Indicator lighting)
Ⓒ.....Adjust point of pilot circuit

• Adjustment points



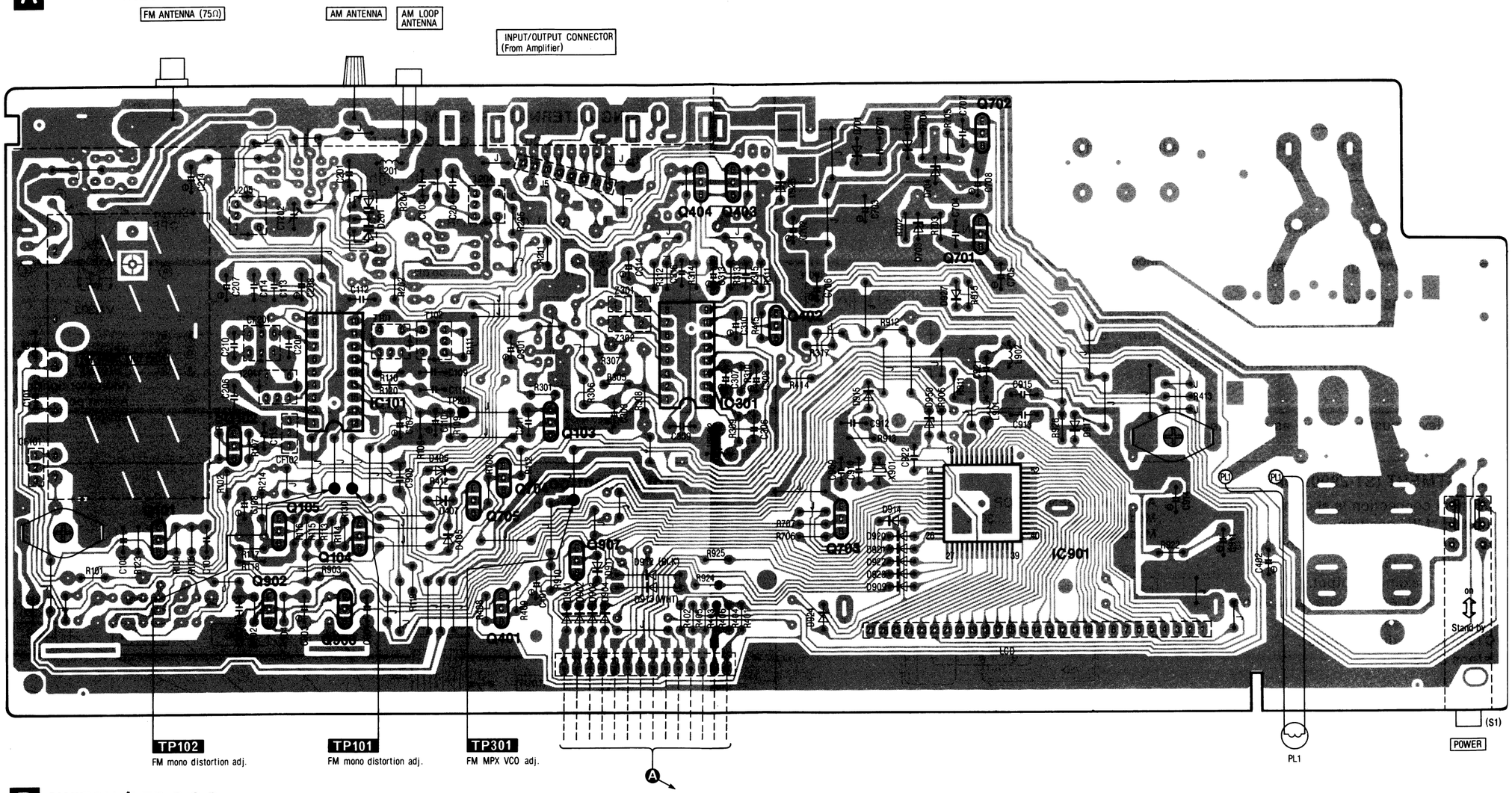
[Fig. I]

It can be removed by use of pincers. Insert it into the original hole when not needed.

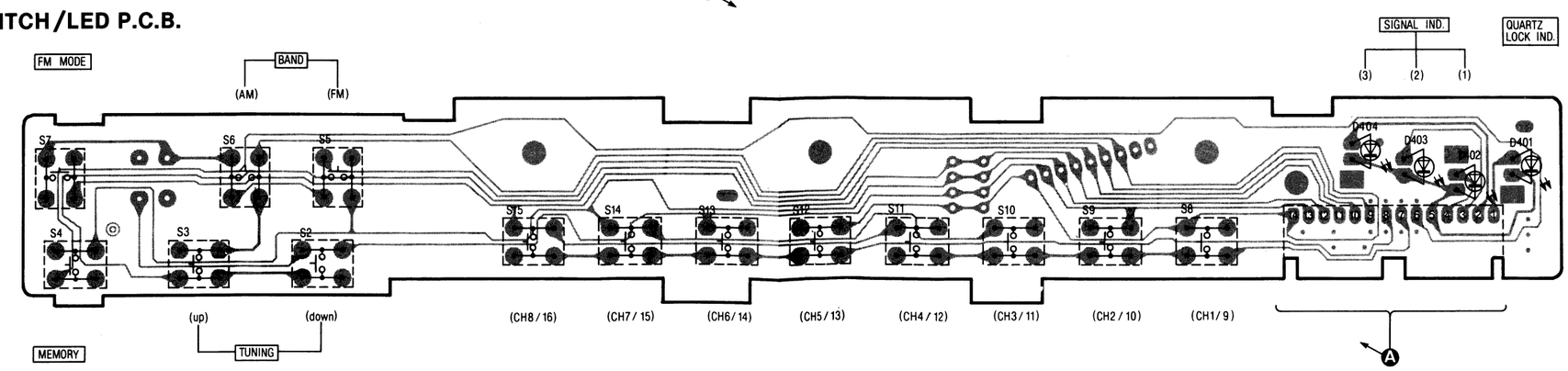


■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (ST-Z990)

A MAIN P.C.B.

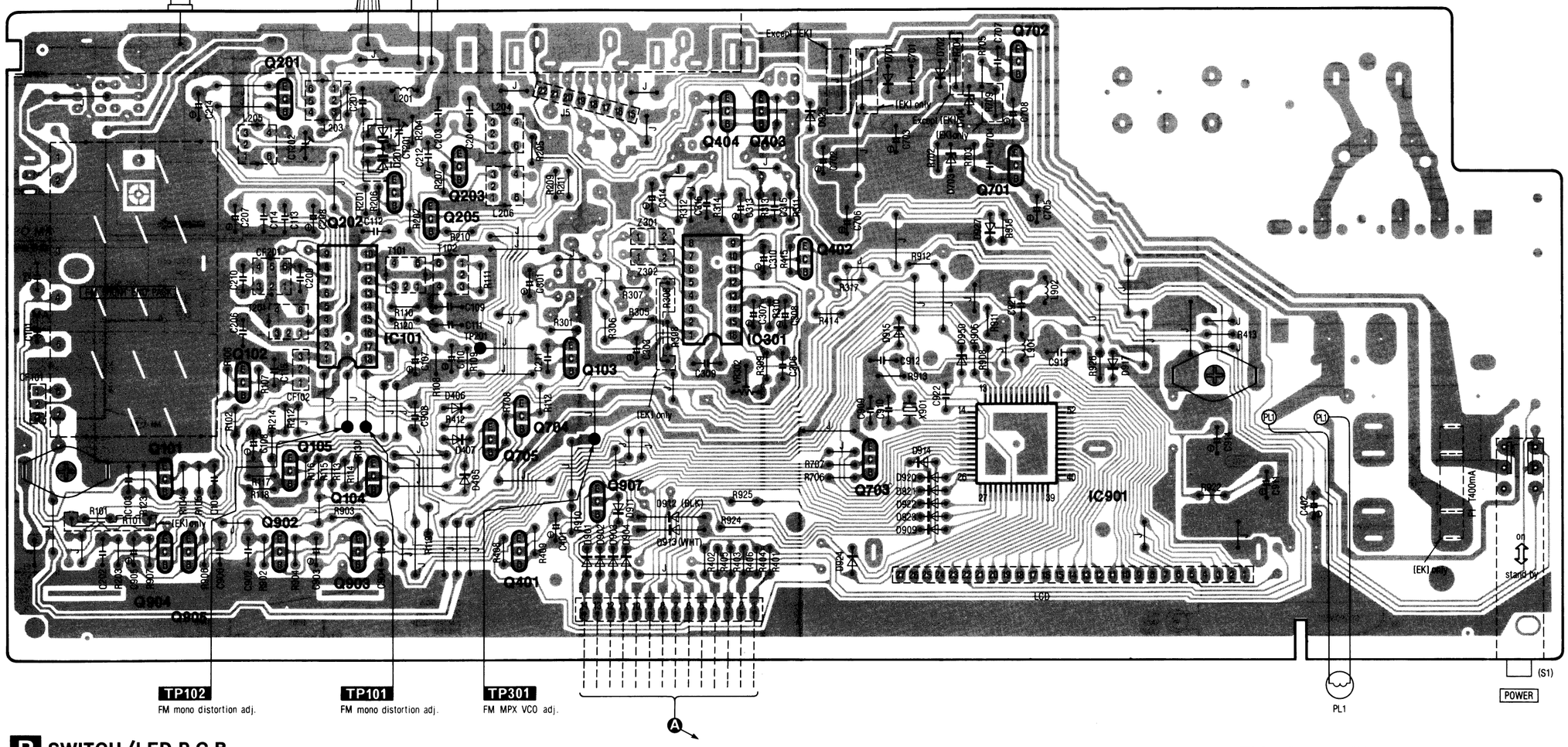


B SWITCH/LED P.C.B.

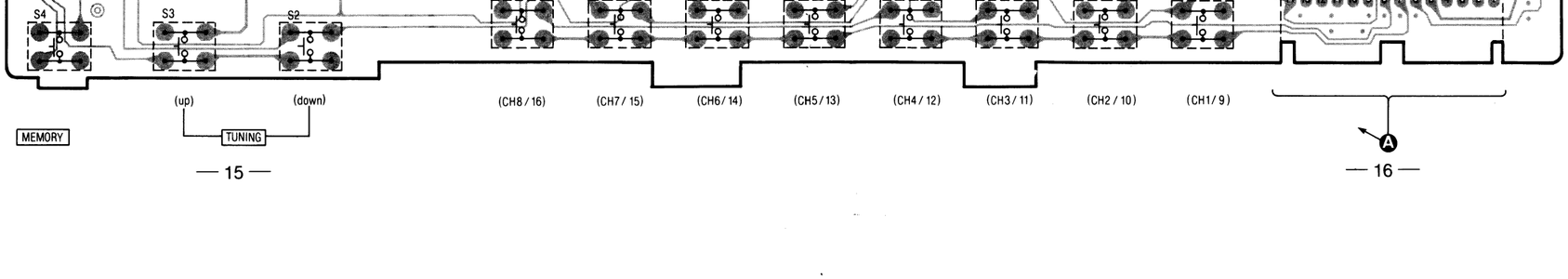


■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (ST-Z990L)

A MAIN P.C.B.



B SWITCH/LED P.C.B.



■ RESISTO

Notes:
- Part numbe
  Please use
- Important
  Componen
  teristics in
  these com
  parts.

Numbering Syst

Example

ERD	25	F
Type	Wattage	Shape

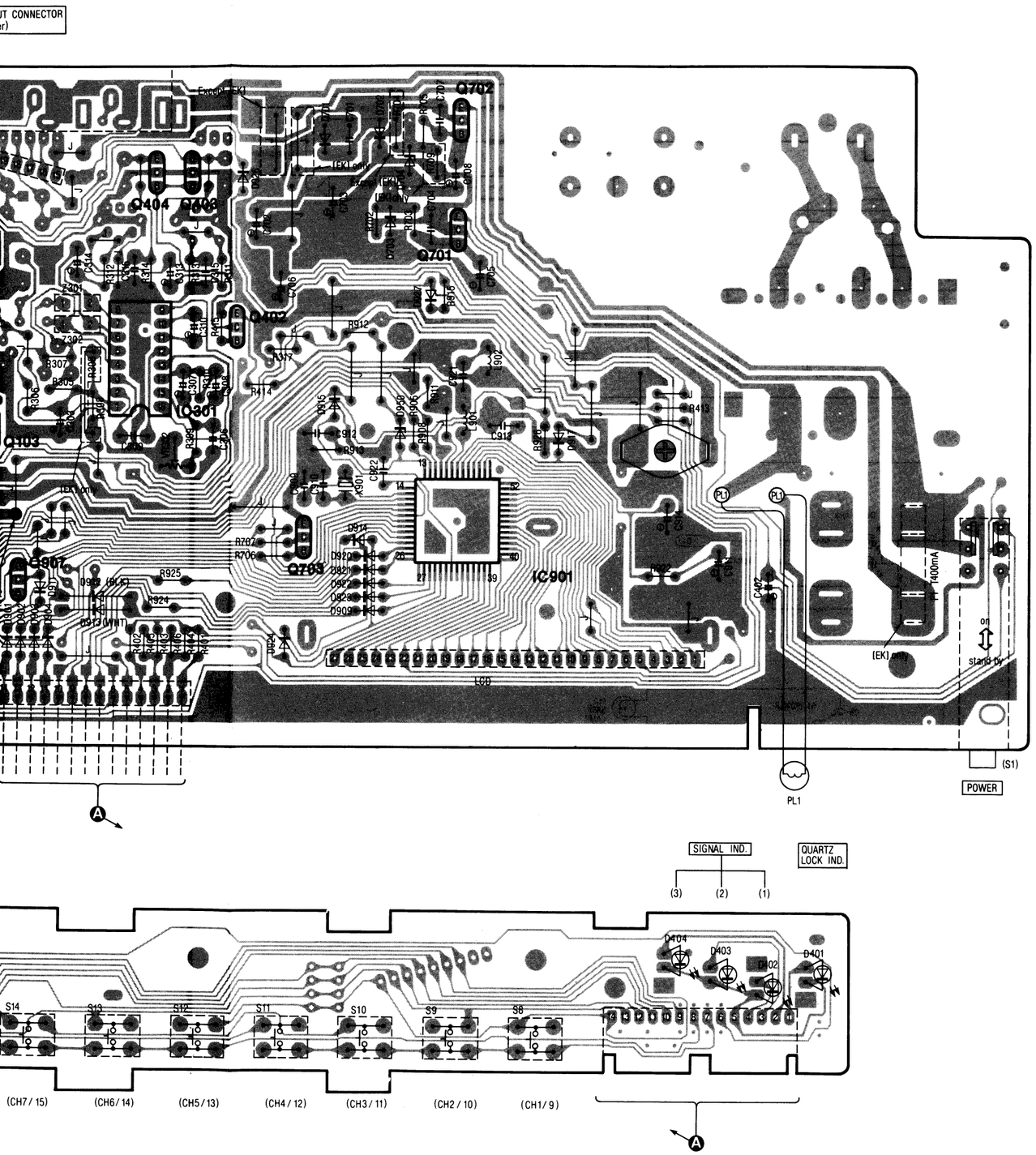
Resistor Type	
ERD	: Carbon
ERC	: Solid
ERO	: Metal Film

● RESISTORS

Ref. No.	Part No
R101 [EK]	ERG1ANJ15
R101 [other]	ERDS2TJ15
R102	ERDS2TJ12
R104	ERDS2TJ47
R105	ERDS2TJ12
R106	ERDS2TJ82
R107	ERDS2TJ27
R108	ERDS2TJ10
R109	ERDS2TJ47
R110	ERDS2TJ82
R111	ERDS2TJ22
R112	ERDS2TJ10
R113, 114	ERDS2TJ22
R115	ERDS2TJ56
R116	ERDS2TJ47
R117	ERDS2TJ10
R118	ERDS2TJ15
R119	ERDS2TJ82
R120	ERDS2TJ56
R123	ERDS2TJ18
R130	ERDS2TJ56
R201	ERDS2TJ10
R202	ERDS2TJ10
R203	ERDS2TJ47
R204	ERDS2TJ10
R205	ERDS2TJ82
R206	ERDS2TJ18
R207	ERDS2TJ22
R209	ERDS2TJ12
R210	ERDS2TJ47
R211	ERDS2TJ12
R212	ERDS2TJ18
R214	ERDS2TJ47
R301	ERDS2TJ33
R305, 306	ERDS2TJ22
R307	ERDS2TJ27
R308 [EK]	ERG1ANJ15
R308 [other]	ERDS2TJ15
R309	ERDS2TJ15
R310	ERDS2TJ10
R311, 312	ERDS2TJ33
R313, 314	ERDS2TJ10
R317	ERDS2TJ10
R401	ERDS2TJ33
R402	ERDS2TJ22
R403	ERDS2TJ18
R404	ERDS2TJ15
R405	ERDS2TJ12
R406	ERDS2TJ56
R408	ERDS2TJ18
R409	ERDS2TJ56
R412	ERDS2TJ12
R413	ERDS2TJ56
R414	ERDS2TJ10

5 6 7 8 9

RAM (ST-Z990L)



■ RESISTORS AND CAPACITORS

Notes:
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
- Important safety notice. Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- The unit of resistance is OHM (Ω). K=1000Ω, M=1000kΩ
- The unit of capacitance is MICROFARAD (μF). P=10⁻⁶μF.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

Resistor Type		Wattage		Tolerance	
ERD	: Carbon	25	: 1/4W	F	: ±1%
ERC	: Solid	S2	: 1/4W	J	: ±5%
ERO	: Metal Film	S1	: 1/2W	K	: ±1%
		12	: 1/2W		

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type		Voltage			Tolerance	
		ECEA Type		Other		
ECEA	: Electrolytic	0J	: 6.3V	1H	: 50V DC	C : ±0.25pF
ECCD	: Ceramic	1A	: 10V	1	: 125V DC	G : ±2%
ECKD	: Ceramic	1C	: 16V	KC	: 400V AC	J : ±5%
ECQM	: Polyester	1E	: 25V			K : ±10%
ECQP	: Polypropylene	1H	: 50V			Z : +80%, −20%
		1V	: 35V			
		25	: 25V			

● RESISTORS

Ref. No.	Part No.	Value
R101 [EK]	ERG1ANJ151	150
R101 [other]	ERDS2TJ151	150
R102	ERDS2TJ122	1.2K
R104	ERDS2TJ474	470K
R105	ERDS2TJ122	1.2K
R106	ERDS2TJ824	820K
R107	ERDS2TJ271	270
R108	ERDS2TJ102	1K
R109	ERDS2TJ471	470
R110	ERDS2TJ822	8.2K
R111	ERDS2TJ222	2.2K
R112	ERDS2TJ104	100K
R113, 114	ERDS2TJ223	22K
R115	ERDS2TJ563	56K
R116	ERDS2TJ471	470
R117	ERDS2TJ104	100K
R118	ERDS2TJ153	15K
R119	ERDS2TJ822	8.2K
R120	ERDS2TJ561	560
R123	ERDS2TJ182	1.8K
R130	ERDS2TJ563	56K
R201	ERDS2TJ103	10K
R202	ERDS2TJ102	1K
R203	ERDS2TJ471	470
R204	ERDS2TJ104	100K
R205	ERDS2TJ821	820
R206	ERDS2TJ182	1.8K
R207	ERDS2TJ223	22K
R209	ERDS2TJ122	1.2K
R210	ERDS2TJ473	47K
R211	ERDS2TJ122	1.2K
R212	ERDS2TJ183	18K
R214	ERDS2TJ474	470K
R301	ERDS2TJ333	33K
R305, 306	ERDS2TJ223	22K
R307	ERDS2TJ274	270K
R308 [EK]	ERG1ANJ151	150
R308 [other]	ERDS2TJ151	150
R309	ERDS2TJ153	15K
R310	ERDS2TJ102	1K
R311, 312	ERDS2TJ332	3.3K
R313, 314	ERDS2TJ104	100K
R317	ERDS2TJ103	10K
R401	ERDS2TJ331	330
R402	ERDS2TJ221	220
R403	ERDS2TJ181	180
R404	ERDS2TJ151	150
R405	ERDS2TJ122	1.2K
R406	ERDS2TJ561	560
R408	ERDS2TJ182	1.8K
R409	ERDS2TJ563	56K
R412	ERDS2TJ123	12K
R413	ERDS2TJ562	5.6K
R414	ERDS2TJ102	1K
R415	ERDS2TJ473	47K
R702	ERDS2TJ102	1K
R703	ERDS2TJ101	100
R704 Except [EK]	ERDS2TJ102	1K
R705	ERDS2TJ101	100
R706	ERDS2TJ104	100K
R707	ERDS2TJ103	10K
R708	ERDS2TJ473	47K
R709 [EK] only	ERDS2TJ152	1.5K
R902	ERDS2TJ562	5.6K
R903	ERDS2TJ103	10K
R904	ERDS2TJ561	560
R905	ERDS2TJ102	1K
R906	ERDS2TJ153	15K
R907	ERDS2TJ332	3.3K
R908	ERDS2TJ102	1K
R910	ERDS2TJ473	47K
R911	ERDS2TJ102	1K
R912	ERDS2TJ101	100
R913	ERDS2TJ562	5.6K
R915	ERDS2TJ103	10K
R922	ERDS2TJ681	680
R924, 925	ERDS2TJ152	1.5K
R926	ERDS2TJ104	100K

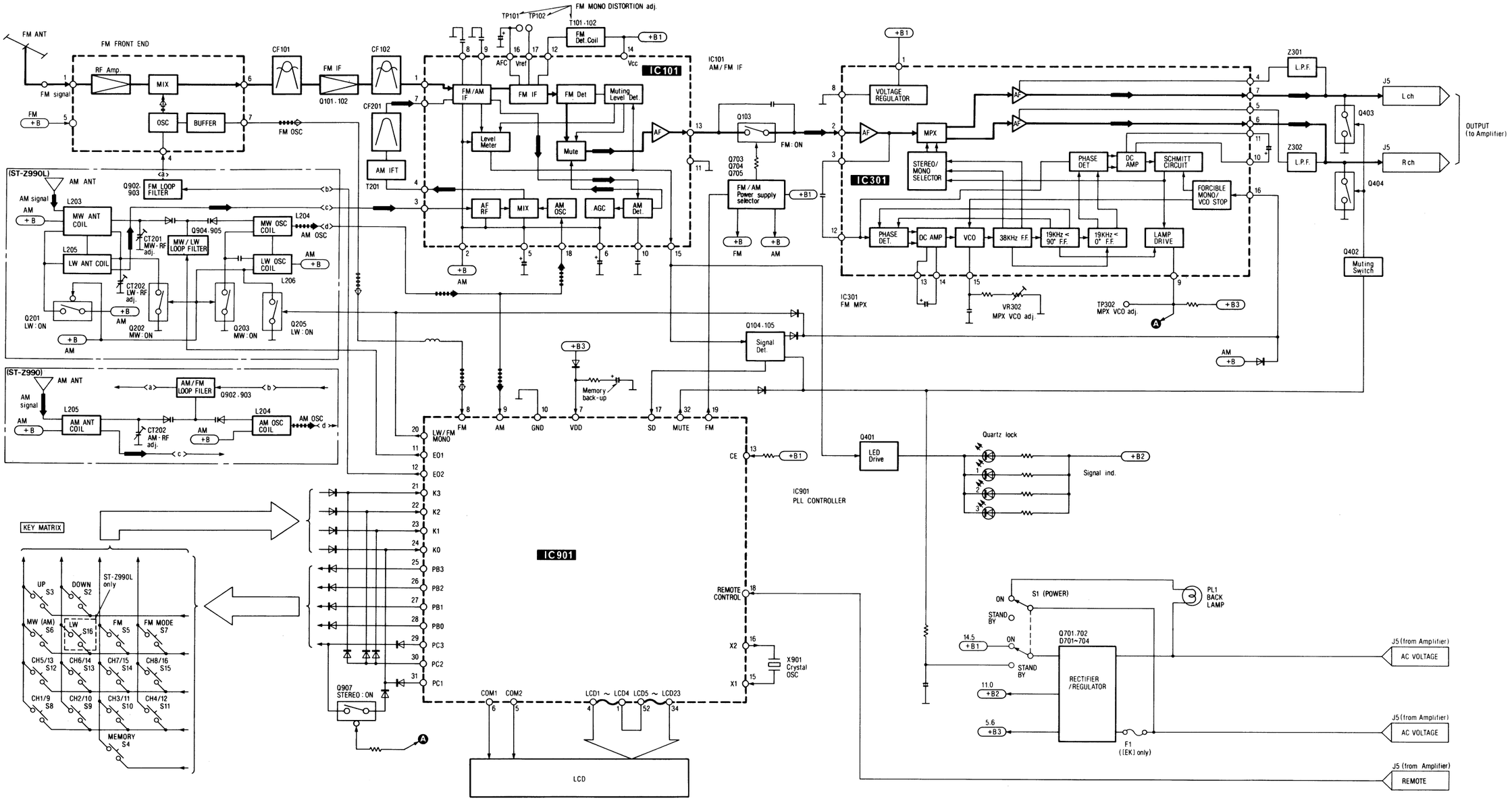
● CAPACITORS

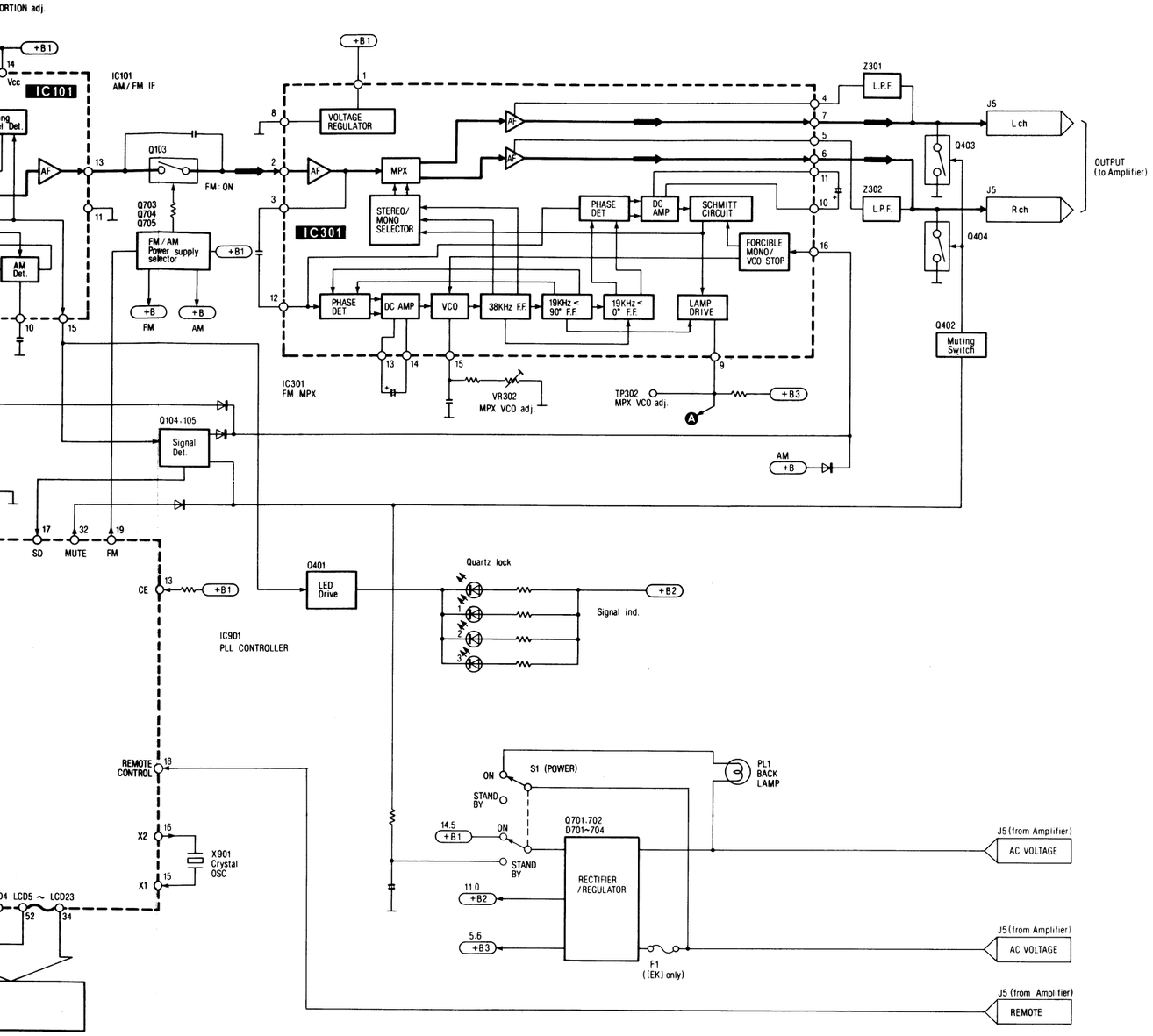
Ref. No.	Part No.	Value
C2	ECKD1H103ZF	0.01
C101	ECKD1H103ZF	0.01
C103	ECKD1H103ZF	0.01
C105	ECCD1H390KC	39P
C107	ECEA1HU010	1
C108	ECEA1CU100	10
C109	ECKD1H103ZF	0.01
C110	ECEA1CU100	10
C111	ECCD1H101K	100P
C112, 113	ECKD1H223ZF	0.022
C114	ECKD1H223ZF	0.022
C115	ECCD1H100KC	10P
C201	ECQM1H473JZ	0.047
C202	ECKD1H223ZF	0.022
C203	ECCD1H180KC	18P
C204	ECQP1471JZ	470P
C206	ECKD1H223ZF	0.022
C207	ECEA0JU101	100
C208	ECEA1EK4R7	4.7
C209	ECCD1H080CC	8P
C210	ECCD1H470K	47P
C211	ECFTD153KXL	0.015
C212	ECQP1391JZ	390P
C214	ECEA1AU101	100
C301	ECEA1CU100	10
C303	ECEA1CU101	100
C306	ECQP1471JZ	470P
C307	ECEA1HK010	1
C308	ECEA1HK3R3	3.3
C309	ECKD1H473ZF	0.047
C310	ECEA1HUR47	0.47
C313, 314	ECEA1HUR47	0.47
C315, 316	ECFTD153KXL	0.015
C401	ECEA1HU3R3	3.3
C402	ECEA1HU4R7	4.7
C701	ECKD2H102ZF	0.001
C702	ECEA1EU471	470
C703	ECEA1VU102	1000
C704	ECKD1H103ZF	0.01
C705	ECEA1CU471	470
C706	ECEA1CU222	2200
C707	ECKD1H103ZF	0.01
C708	ECEA1CU470	47
C902	ECKD1H223ZF	0.022
C903	ECEA25M4R7R	4.7
C904	ECKD1H103ZF	0.01
C905	ECEA1HU010	1
C906	ECKD1H223ZF	0.022
C908, 909	ECCD1H470K	47P
C910	ECCD1H100KC	10P
C911	ECEA0JU332	3300
C912, 913	ECKD1H103ZF	0.01
C914	ECEA0JU102	1000
C921	ECCD1H181K	180P
C922	RCBS1H102KBY	0.001

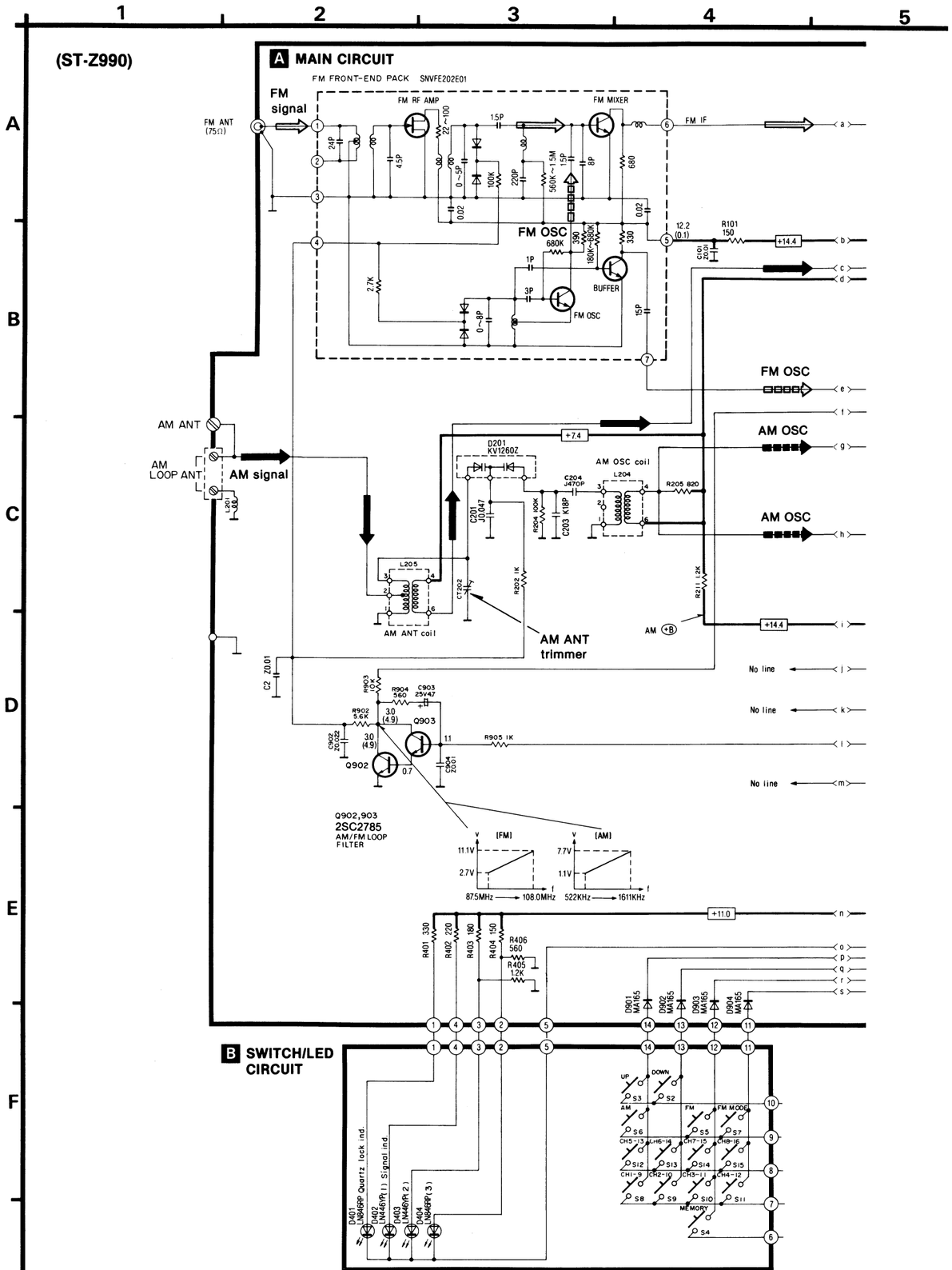
● Change of Parts List (ST-Z990 from ST-Z990L)

Ref. No.	Change of Part No. ST-Z990L [EK] ➡ ST-Z990 [EX, EH, Ei, XA, XL]		Description
RESISTORS			
R101	ERG1ANJ151	ERDS2TJ151	150Ω
R201	ERDS2TJ103	———	(Deletion)
R203	ERDS2TJ471	———	(Deletion)
R206	ERDS2TJ182	———	(Deletion)
R207	ERDS2TJ223	———	(Deletion)
R209	ERDS2TJ122	———	(Deletion)
R210	ERDS2TJ473	———	(Deletion)
R212	ERDS2TJ183	———	(Deletion)
R308	ERG1ANJ151	ERDS2TJ151	150Ω
R704	———	ERDS2TJ102	(Addition) 1kΩ
R709	ERDS2TJ152	———	(Deletion)
R906	ERDS2TJ153	———	(Deletion)
R907	ERDS2TJ332	———	(Deletion)
R908	ERDS2TJ102	———	(Deletion)
CAPACITORS			
C202	ECKD1H223ZF	———	(Deletion)
C212	ECQP391JZ	———	(Deletion)
C905	ECEA1HU010	———	(Deletion)
C906	ECKD1H223ZF	———	(Deletion)
C915	———	ECKD1H103ZF	(Addition) 0.01μF

■ BLOCK DIAGRAM




ORTION adj.
+B1
IC101
AM/FM IF
IC101
Vcc
AF
AM Det.
Q103
FM : ON
Q703
Q704
Q705
FM / AM Power supply selector
+B
FM
AM
VOLTAGE REGULATOR
IC301
STEREO/ MONO SELECTOR
MPX
PHASE DET
DC AMP
SCHMITT CIRCUIT
FORCIBLE MONO/ VCO STOP
LAMP DRIVE
38KHz F.F.
19KHz < 90° F.F.
19KHz < 0° F.F.
VCO
IC301
FM MPX
VR302
MPX VCO adj.
TP302
MPX VCO adj.
+B3
Z301
L.P.F.
Z302
L.P.F.
J5
L ch
R ch
Q403
Q404
OUTPUT
(to Amplifier)
Q402
Muting Switch
AM
+B
Q104.105
Signal Det.
SD
MUTE
FM
CE
+B1
Q401
LED Drive
Quartz lock
+B2
Signal ind.
IC901
PLL CONTROLLER
REMOTE CONTROL
X2
X1
X901
Crystal OSC
LCD5 ~ LCD23
S1 (POWER)
ON
STAND BY
PL1
BACK LAMP
14.5
+B1
Q701.702
D701~704
RECTIFIER /REGULATOR
11.0
+B2
5.6
+B3
F1
(IEK) only)
J5 (from Amplifier)
AC VOLTAGE
J5 (from Amplifier)
AC VOLTAGE
J5 (from Amplifier)
REMOTE


1
2
3
4
5
A
B
C
D
E
F
G
(ST-Z990)
A MAIN CIRCUIT
FM FRONT-END PACK SNVFE202E01
FM signal
FM ANT (75Ω)
FM RF AMP
FM MIXER
FM IF
FM OSC
BUFFER
AM ANT
AM LOOP ANT
AM signal
AM OSC coil
AM ANT coil
AM ANT trimmer
D201 KV1260Z
L204
L205
C204 J470P
C201 J0.047
C203 K18P
R204 430K
R202 1K
R211 1.2K
R205 820
+7.4
+14.4
+11.0
R101 150
No line
Q902,903 2SC2785 AM/FM LOOP FILTER
[FM]
[AM]
87.5MHz → 108.0MHz
522KHz → 1611KHz
R401 330
R402 220
R403 180
R404 150
R406 560
R405 1.2K
D901 MA165
D902 MA165
D903 MA165
D904 MA165
B SWITCH/LED CIRCUIT
D401 LN846RP Quartz lock ind.
D402 LN446YA (1) Signal ind.
D403 LN446YA (2)
D404 LN846RP (3)
UP
DOWN
AM
FM
FM MODE
MEMORY
CH5-13
CH6-14
CH7-15
CH8-16
CH1-9
CH2-10
CH3-11
CH4-12

(ST-Z990L)

A MAIN CIRCUIT

FM FRONT-END PACK SNVFE202E01

FM signal

FM ANT (75Ω)

FM RF AMP

FM MIXER

FM IF

FM OSC

BUFFER

IC101 AN7273A FM IF DET & AM CON

Q101, 102 2SC2787L FM IF AMP

Q103 2SC3311 SWITCHING

IC301 AN7470 FM MPX

FM AF signal (Lch)

FM AF signal (Rch)

Q403, 404 2SC3311 MUTING CONTROL

ST-Z990L only

R212 18kΩ

TP102

TP101

TP301

19kHz output

MPX VCO adj.

FM MONO DISTORTION adj.

Q703 2SC3311 SWITCHING

Q704, 705 2SA1309A SWITCHING

FM off set voltage (0mV)

Q401 2SC1685 SIGNAL IND. DRIVE

Q104, 105 2SC3311 SIGNAL IND. DRIVE

Q402 2SA1309A MUTING SWITCH

S1 (POWER)

on

stand by

MW ANT trimmer

AM ANT

AM LOOP ANT

AM signal

AM OSC

MW ANT coil

LW ANT coil

LW ANT trimmer

MW OSC coil

LW OSC coil

Q201 2SA1309A MW/LW SWITCHING

Q202, 203 2SC2785 MW/LW SWITCHING

Q205 2SC3311 MW/LW SELECTOR

Q902, 903 2SC2785 FM LOOP FILTER

Q904, 905 2SA1309Q MW/LW LOOP FILTER

Memory back-up

Q701 2SC1384 REGULATOR

Q702 2SC3311 REGULATOR

2SC1384 : [EK] only

Except [EK]

[EK] only

F1 T400mA

AC9.3V

ST-Z990 only

Crystall oscillator (4.5MHz)

IC901 μPD1718G514 PLL CONTROLLER

"H" with forcible monaural mode

REMOTE CONTROL

LCD SEGMENT

Q907 2SA1309A SWITCHING

Refer to Note 2

B SWITCH/LED CIRCUIT

D401 HSM69F Quartz lock ind.

D402 HN461R(1) Signal ind.

D403 HN461R(2)

D404 HSM69F(3)

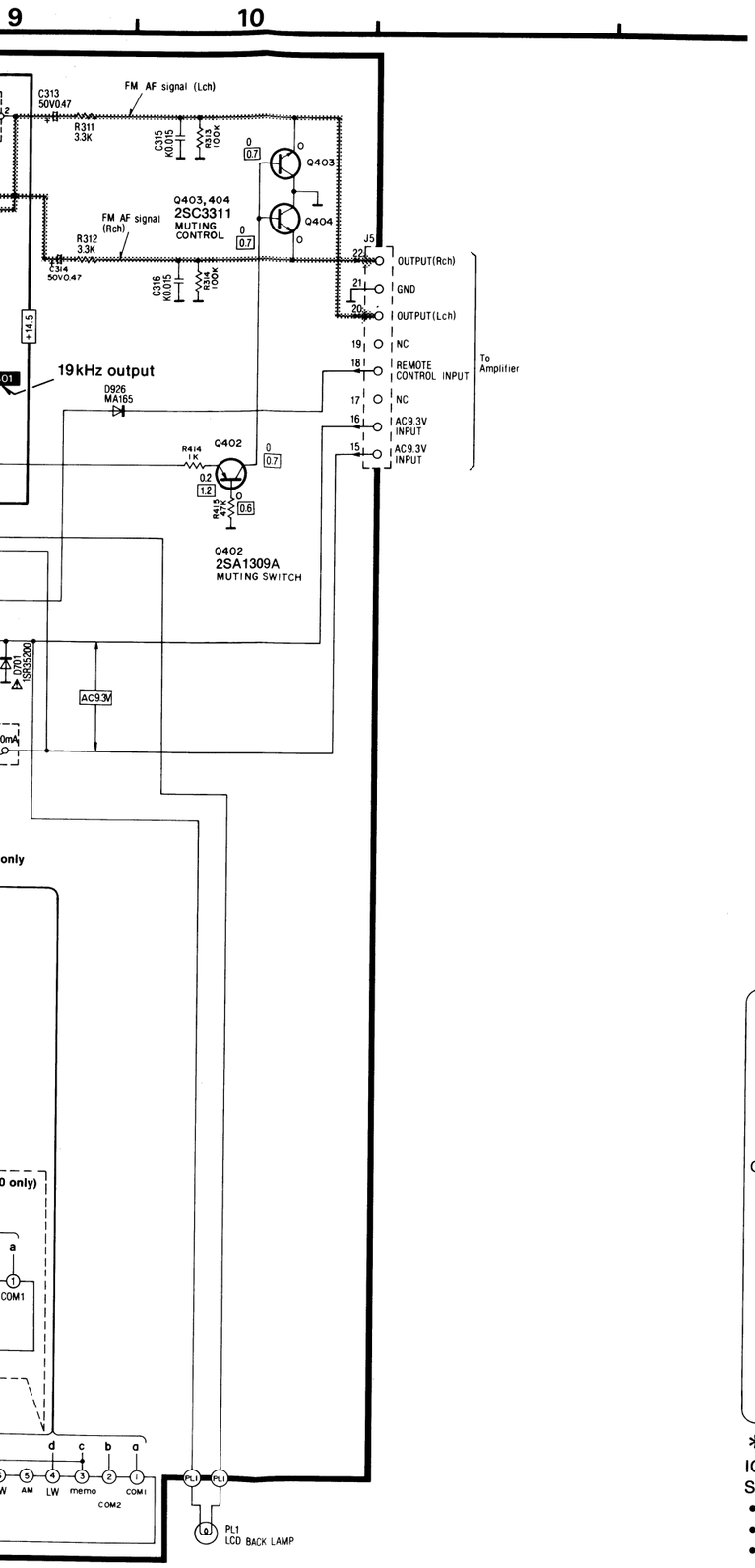
(ST-Z990 only)

Liquid Crystal Display (LCD)

PL1 LCD BACK LAMP

— 21 —

— 22 —



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

- **S1** : Power switch in "on" position.
- **S2** : Tuning (down) switch.
  [down: tuning to lower frequency]
- **S3** : Tuning (up) switch.
  [up: tuning to higher frequency]
- **S4** : Memory set switch. (manual ↔ auto memory)
- **S5** : FM select switch.
- **S6** : AM select switch.
- **S7** : FM mode switch. (stereo ↔ mono)
- **S8~S15** : Preset tuning switch.
  * With it momentarily pushed (less than 0.4 sec.) and released, the 1~8 CH are received.
  * With it continuously pushed (0.4 sec. or more) and released, the 9~16 CH are received.
- **S16 (ST-Z990L only)**: LW select switch.
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
  All voltage values shown in circuitry are DC voltage in FM signal (no signal) reception modes.
  * Figures in ➤ ◀ stand for DC voltage in FM stereo signal reception mode.
  * Figures in ( ) stand for DC voltage in AM signal reception mode.
  * Figures in ⌈ ⌋ stand for DC voltage in LW signal reception mode.
  * Figures in ▭ stand for muting mode.

Positive voltage lines
FM OSC
AM OSC
AF signal lines
FM signal
AM signal

- Important safety notice.
  Components identified by ⚠ mark have special characteristics important for safety.
  When replacing any of these components, use only manufacturer's specified parts.

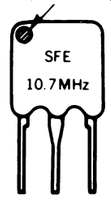
Part No.	Original Part No.	Supply Part No.
IC301 D912, 913	AN7470 MA150	SVIUPC1161C3 MA162A

Note 2:

• Use of ceramic filters in pairs

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three versions. For this circuit, be sure to use the ceramics of the same version in a pair.
At repairing and replacement, pay close attention to the diodes (D912, D913) for use as different diodes must be used depending on each version of the ceramic filters.

Color marking
(Red, Black or White)



VERSION (Color)	D912	D913	CENTER FREQUENCY
Black	○	×	10.65MHz
Red	×	×	10.70MHz
White	×	○	10.75MHz

Note: ○ mark: Diode is used.
× mark: Diode is not used.

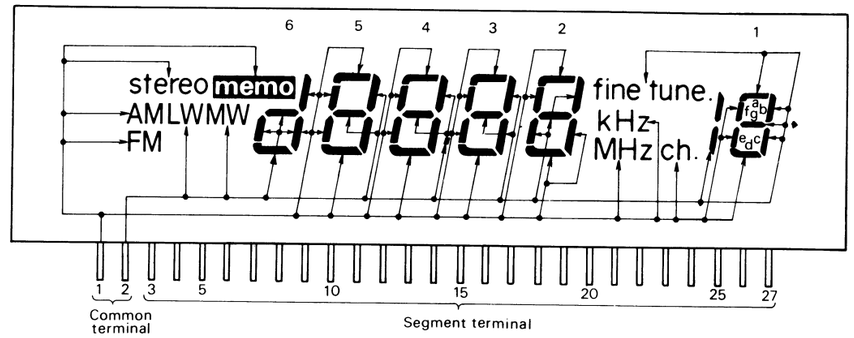
* Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

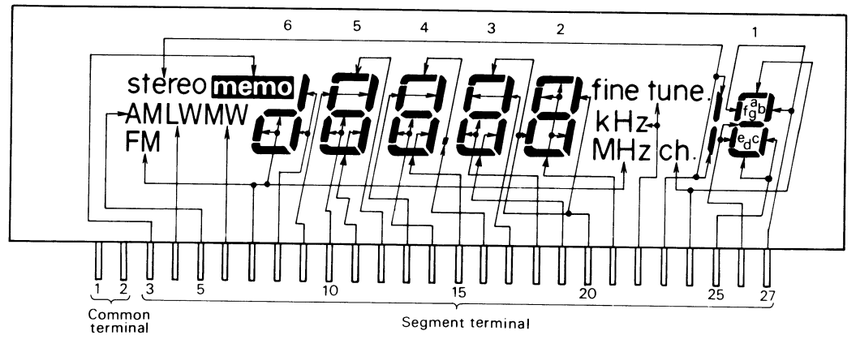
- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

■ DESCRIPTION OF LCD PANEL

• COMMON



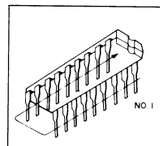
• SEGMENT



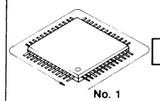
No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
COM1	COM1	—	MEMO	—	AM	—	FM, MHz	6b	5f	5e	5d	5a	4f	4e	4d
COM2	—	COM2	—	LW	—	MW	6deg	6c	5b	5g	5c	—	4b	4g	4c

No.	16	17	18	19	20	21	22	23	24	25	26	27
COM1	4a	3f	3e	3d	3a	2acdf	kHz	stereo	ch	1d	1e	1f
COM2	▰	3b	3g	3c	2be	2g	fine tune	▰	1a	1c	1g	1b

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

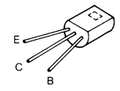


AN7273A	18 Pin
AN7470	16 Pin

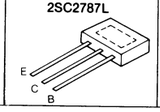


μPD1718G514 | 52 Pin

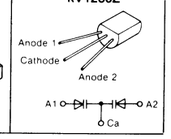
2SC1384R
2SC1685



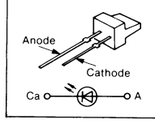
2SA1309
2SC3311
2SC2785F
2SC2787L



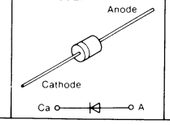
kV1260Z



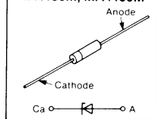
LN346GP, LN446YP
LN846RP



MA165, 1SR35200
MA160LF



MA29WA, MA4062M
MA4150M, MA4100M



■ REPLACEMENT PARTS LIST

Notes:
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
- The parenthesized numbers in the column of description stand for the quantity per set.

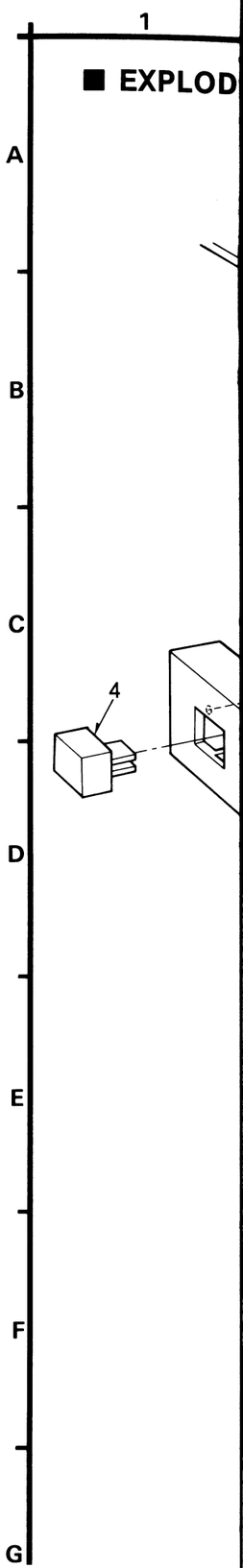
Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN7273B	Integrated Circuit
IC301	SVIUPC1161C3	Integrated Circuit
IC901	UPD1718G514	Integrated Circuit
TRANSISTORS		
Q101, 102	2SC2787L	Transistor
Q103~105, 205, 403, 404, 703	2SC3311−Q	Transistor
Q401	2SC1685−QNC	Transistor
Q201, 402, 704, 705, 904, 905, 907	2SA1309Q	Transistor
Q202, 203, 902, 903	2SC2785F	Transistor
Q701	2SC1384A−R	Transistor
Q702 [EK] only	2SC1384A−R	Transistor
Q702 [other]	2SC3311−Q	Transistor
DIODES		
D201	KV1260Z	Diode
D401	LN846RP	L.E.D.
D402~404	LN446YP	L.E.D.
D405~407, 901~904, 909, 911, 914, 915, 917, 920~924, 926	MA165	Diode
D701, 702 ⚠	1SR35200	Rectifier
D703	MA4150M	Diode
D704	MA4062M	Diode
D912, 913	MA162A	Diode
D927	MA29WA	Diode
D950	MA4100M	Diode
COILS		
L201, 901	ELEPKR22MA	Choke, 0.22µH
L203	SLA2B3−P	MW Antenna
L204	SLO2B9R−P	MW OSC
L205	SLA1B7R−P	LW Antenna
L206	SL01B5−P	LW OSC
L902	ELEPK1R2MA	Choke, 1.2µH
TRANSFORMERS		
T101	SLI4B511−Z	FM IFT
T102	SLI4B513−Z	FM IFT
T201	SLI2B101−M	AM IFT

Ref. No.	Part No.	Description
CERAMIC FILTERS		
CF101, 102	SVFE107MS2−A	FM, 10.7MHz (Red)
	SVFE107MS2−D	FM, 10.65MHz (Black)
	SVFE107MS2−E	FM, 10.75MHz (White)
CF201	SVFSFZ450F7L	AM, 450kHz
CRYSTAL		
X901	SVQ49U452−T	4.5MHz Counter OSC
COMPONENT COMBINATIONS		
Z301, 302	EXRP181K473C	180pF, 47kΩ
VARIABLE RESISTOR		
VR302	QVNB3A00B472	FM MPX VCD Adj.
VARIABLE CAPACITORS		
CT201	ECRHA010A41	AM Antenna
CT202	ECRHA020D41	LW Antenna
LIQUID CRYSTAL DISPLAY		
LCD	SALHLC9225−6	LCD
FM FRONT END		
	SNVFE202E01	FM Front End Pack
LAMP		
PL1	XAMS15S150	Lamp
FUSE		
F1 [EK] only ⚠	XBA2C04TB0	400mA, 250V
SWITCHES		
S1	SSH1196	Power Switch
S2~16	SSG13	Preset, Band Selector, FM Mode, Tuning, Memory

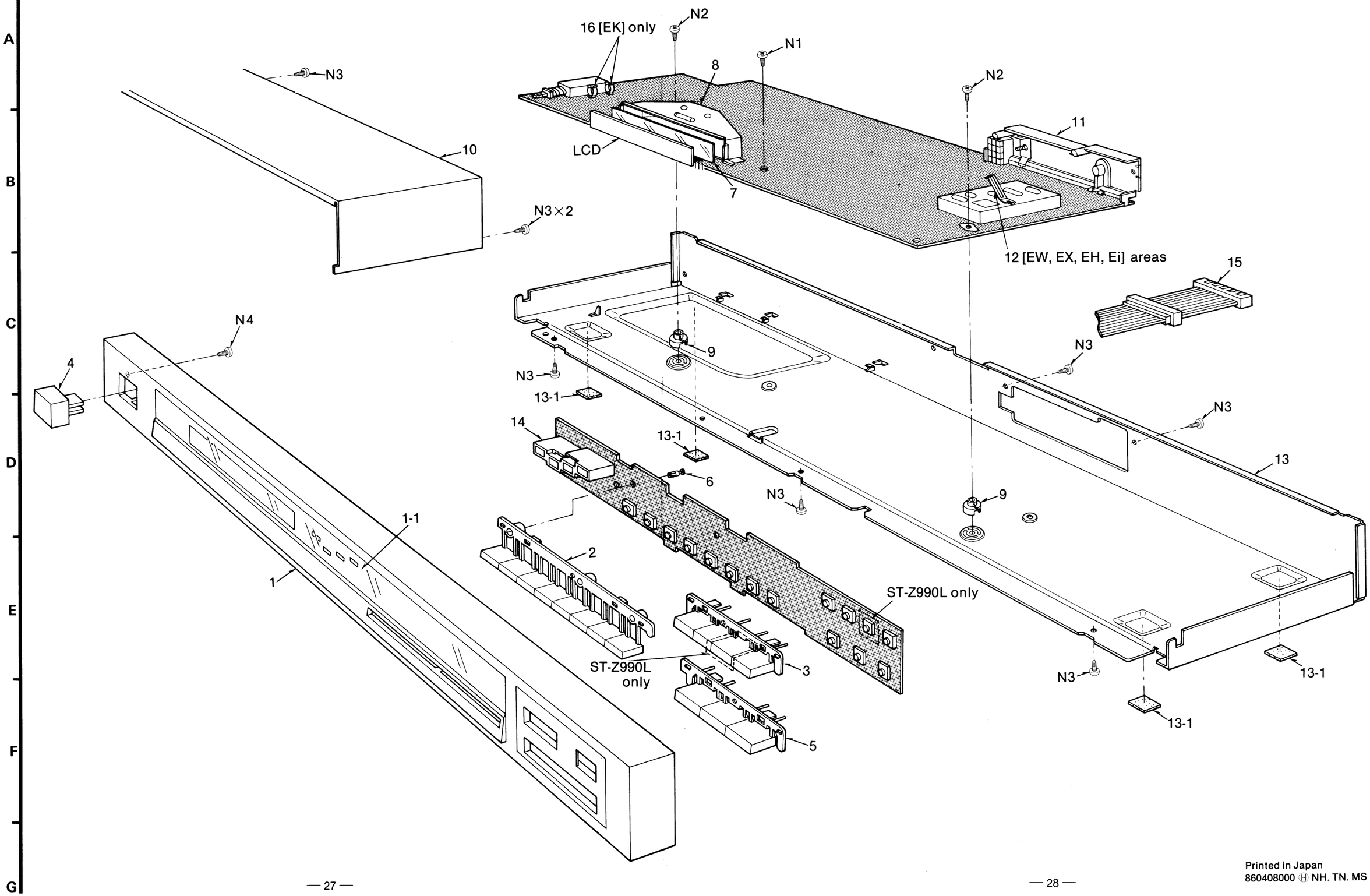
Ref. No.	Part No.	Description	
CABINET and CHASSIS PARTS			
1 [EK]	SGYTZ990L−KK	Front Panel Ass'y	(1)
1 [other]	SGYTZ990L−KE	Front Panel Ass'y	(1)
1-1	SDU293B	Transparent Plate	(1)
2	SBC814−1	Preset Button	(1)
3	SBC816−1	Selector Button Ass'y	(1)
4	SBC666−3	Power Button	(1)
5	SBC815−1	Tuning Button	(1)
6	SHR415	Nylon Pin	(1)
7	SDU296A	Filter	(1)
8	SMP409	Lamp Case	(1)
9	SHE170−1	Spacer	(2)
10	SKC1930K99	Cabinet	(1)
11	SJF8302N	Terminal Board	(1)
12 [EW] only	SUS803	Spring, Ground	(1)
13 [EK]	SGPTZ990L−KK	Rear Panel Ass'y	(1)
13 [other]	SGPTZ990L−KE	Rear Panel Ass'y	(1)
13-1	SKL297−1	Foot	(4)
14	SHR9798	L.E.D. Case	(1)
15	SWK1659−1	Cord	(1)
16 [EK] only	SJT347	Fuse Holder	(2)
SCREWS			
N1	XTB3+8G	Tapping, ⊕3×8	(1)
N2	XTBS3+12F1	Tapping, ⊕3×12	(2)
N3	XTBS3+8JFZ1	Tapping, ⊕3×8	(8)
N4	XTWS3+10Q	Tapping, ⊕3×10	(1)
ACCESSORIES			
A1	SSA270M	FM Antenna Cord	(1)
A2	SPB1139	Loop Antenna	(1)
A3	SPB1141−2	Bracket	(1)
A4 [EK] only	SJP9009	Adaptor (DIN)	(1)
PACKING PARTS			
P1 [EW, EB]	SPG5719	Carton Box	(1)
P1 [EK]	SPG5720	Carton Box	(1)
P1 [EF]	SPG5721	Carton Box	(1)
P2	SPS4717	Pad, Left Side	(1)
P3	SPS4718	Pad, Right Side	(1)
P4	SPS4755	Pad	(1)
P5	SPP711	Polyethylene Bag	(1)

● Change of Parts List (ST-Z990 from ST-Z990L)

Ref. No.	Change of Part No. ST-Z990L [EK] ➡ ST-Z990 [EX, EH, Ei, XA, XL]		Part Name & Description	Pcs/Set	Remarks
TRANSISTORS					
Q201	2SA1309Q	———	———	—	(Deletion)
Q202, 203	2SC2785F	———	———	—	(Deletion)
Q205	2SC3311−Q	———	———	—	(Deletion)
Q702	2SC1384A−R	2SC3311−Q	Transistor	(1)	
Q904, 905	2SA1309Q	———	———	—	(Deletion)
COILS					
L203	SLA2B3−P	———	———	—	(Deletion)
L204	SLO2B9R−P	SLO2B7−M	AM OSC	(1)	
L205	SLA1B7R−P	SLA2B1−1M	AM Antenna	(1)	
L206	SLO1B5−P	———	———	—	(Deletion)
VARIABLE CAPACITORS					
CT201	ECRHA010A41	———	———	—	(Deletion)
CT202	ECRHA020D41	ECRHA010A41	AM ANT Trimmer	(1)	
FUSE					
F1	XBA2C04TB0	———	———	—	(Deletion)
SWITCH					
S16	SSG13	———	———	—	(Deletion)
CABINET and CHASSIS PARTS					
1	SGYTZ990L−KK	SGYTZ990−KE	Front Panel Ass'y	(1)	
3	SBC816−1	SBCTS75−KM	Button	(1)	
11	SJF8302N	SJF8401N	[XA, XL] Terminal Board	(1)	
		SJF8302N	[other] Terminal Board	(1)	
12	———	SUS803	Spring, Ground	(1)	(Addition)
13	SGPTZ990L−KE	SGPTZ990−KE	[EX, EH] Rear Panel Ass'y	(1)	
		SGPTZ990−KX	[XA, XL] Rear Panel Ass'y	(1)	
		SGPTZ990−KI	[Ei] Rear Panel Ass'y (MELUK)	(1)	
19	SJT347	———	———	—	(Deletion)
ACCESSORIES					
A1	SSA270M	SSA269M	[XA, XL] FM Antenna Cord	(1)	
		SSA270M	[other] FM Antenna Cord	(1)	
A4	SJP9009	———	———	—	(Deletion)
PACKING PARTS					
P1	SPG5720	SPG5718	[Ei] Carton Box (MELUK)	(1)	
		SPG5716	[other] Carton Box	(1)	



■ EXPLODED VIEW



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QUARTZ Synthesizer
AM/FM Stereo Tuner
QUARTZ Synthesizer
LW/MW/FM Stereo Tuner

ST-Z990
ST-Z990L

DEUTSCH

DEUTSCH

■ MESSUNGEN UND JUSTIERUNGEN

AM/FM (ST-Z990)
LW/MW/FM (ST-Z990L)

Einstellungen der Bedienelemente und zu verwendende Geräte.

- MW/UKW-Meßsender (MW/UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analystator
- Oszilloskop
- Elektronische Wechselstrom- und Gleichstrom-Voltmeter (EVM)
- Frequenzzähler
- Drosselspule (100μH)
- Wiederstand (100kΩ)
- Keramischer Kondensator (200pF)

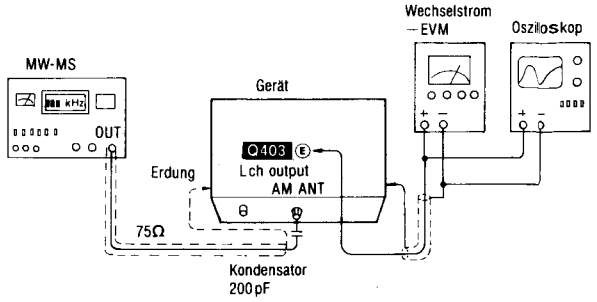
Anmerkung: Für **T201** (AM(MW) ZFT) und **L204** (AM(MW)-OSZ-Spule), werdeven justiert Ersatzteil geliefert. Dien Kern dieses Teils daher nicht drehen.

AM (MW)-HF-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "**AM (MW)**" einstellen.
3. Radio und Signalgenerator auf **612kHz** einstellen.
4. **L205 (AM), L203 (MW)** auf maximale Ausgangsleistung abgleichen.
5. Radio und Signalgenerator auf **1503kHz** einstellen.
6. **CT202 (AM), CT201 (MW)** auf maximale Ausgangsleistung abgleichen.
7. Die Schritte 3.~6. wiederholen.

Anmerkung:
Der Antenneneingang-Signalpegel muß so niedrig wie möglich und frei von automatischer Verstärkungsregelung (AGC) sein.

ZUSTAND DES MW-MESSENDERS
Modulation.....30%
Modulationsfrequenz.....400Hz

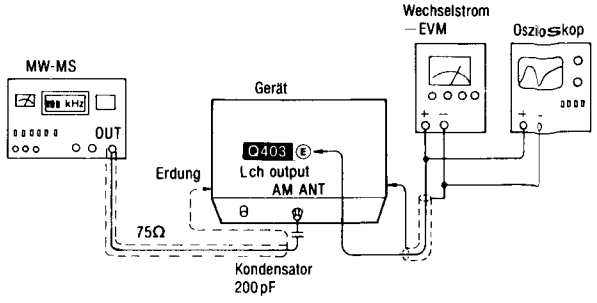


LW-HF-JUSTIERUNG (Nur ST-Z990L)

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "**LW**" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf **155kHz** einstellen.
4. **L206** auf maximale Ausgangsleistung abgleichen.
5. Die Radiofrequenzanzeige und den Meßsender auf **353kHz** einstellen.
6. **CT202** auf maximale Ausgangsleistung abgleichen.
7. Die Schritte 3.~6. wiederholen.

Anmerkung:
Der Antenneneingang-Signalpegel muß so niedrig wie möglich und frei von automatischer Verstärkungsregelung (AGC) sein.

ZUSTAND DES MW-MESSENDERS
Modulation.....30%
Modulationsfrequenz.....400Hz



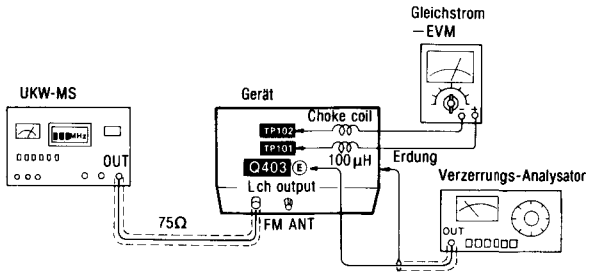
UKW-MONO-VERZERRUNGS-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "**FM (UKW)**" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf **100.10 MHz** einstellen.
4. Den Kern von **T101** so justieren, daß die im Signalzustand gemessene Spannung **0 mV (0±50 mV)** im 1V-Bereich beträgt.
5. **T102** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.
7. Überprüfen, daß die Verzerrungsfaktor des linken und rechten Kanals fast gleich sind.

Anmerkung:

Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

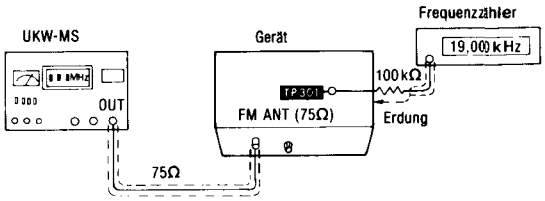
ZUSTAND DES UKW-MESSENDERS
Modulation..... 100%
Modulationsfrequenz..... 400 Hz
Ausgangspegel ..... 66 dB



MPX-SGO-JUSTIERUNG

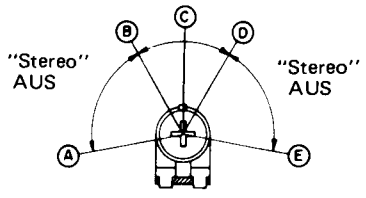
1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Bertriebsart-Wahlschalter indie "**FM/auto**"-Position stellen.
3. Radio und Meßsender auf **100 kHz** einstellen.
4. **VR302** auf **19 kHz±50 Hz** auf der Frequenzzähleranzeige justieren.

ZUSTAND DES UKW-MESSENDERS
Modulation..... 0
Modulationsfrequenz..... 0
Ausgangspegel ..... 66 dB



★ VERWENDUNG EINES ALTERNATIVSYSTEMS

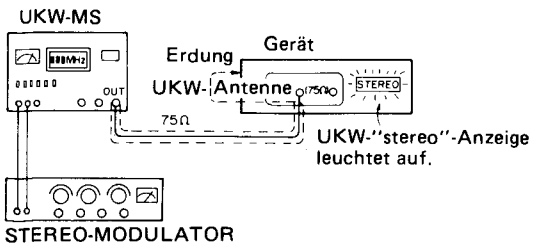
1. Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2. **VR302** justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von **VR302** mit Lack sichern, wie in der Abbildung gezeigt.



VR302

Ⓐ–Ⓑ,
Ⓓ–Ⓔ..... "Stereo"-AUS-Position.
Ⓑ–Ⓓ..... "Stereo"-EIN-Position.
(Anzeige Leuchtet)
Ⓒ..... Punkt der Pilotschaltung justieren.

ZUSTAND DES UKW-MESSENDERS
Modulation..... 10%
Modulationsfrequenz... Pilot (19 kHz)
Ausgangspegel..... 66 dB



STEREO-MODULATOR
Pilotsignal auf ON..... 19 kHz
Ausgangs-Betriebsart.... L + R

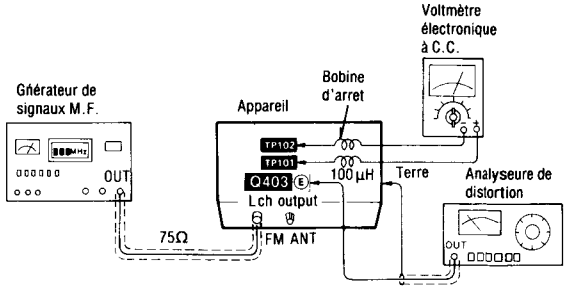
REGLAGE DE DISTORSION MONOPHONIQUE M.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "**FM**" (M.F.).
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **100.10 MHz.**
4. Régler le noyau de **T101** de telle sorte que la tension mesurée sur le mode de signaux soit de **0 mV (0±50 mV)** dans une plage de 1 V.
5. Ajuster **T102** de telle que le facteur de distorsion du canal de gauche soit minimisé.
6. Répéter les étapes 4 et 5 quelques fois.
7. Sássurer que les facteurs de distorsion du canal de gauche et du canal de droite soient sensiblement les mêmes l'un par rapport à l'autre.

Nota:

Le tournevis de réglage utilisé devra être fait en résines.

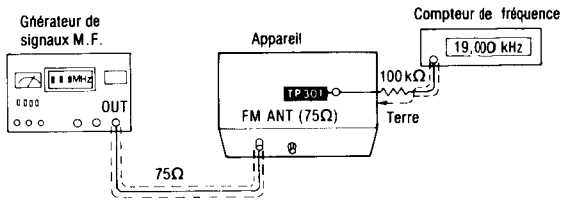
CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation..... 100%
Fréquence de modulation ..... 400 Hz
Niveau de sortie..... 66 dB



REGLAGE MULTIPLEX DE L'OSCILLATEUR COMMANDÉ PAR VARIATION DE TENSION

1. Le raccordement de l'équipement d'essai est montré sur la figure.
2. Régler l'appareil sur la position "**FM/auto**".
3. Régler le cadran radio et le générateur de signaux sur **100 MHz.**
4. Ajuster **VR302** pour **19 kHz±50 Hz** sur le compteur de lecture de fréquences.

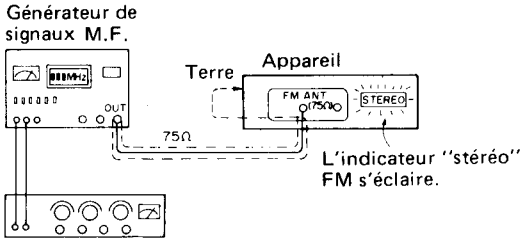
CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation..... 0
Fréquence de modulation 0
Niveau de sortie..... 66 dB



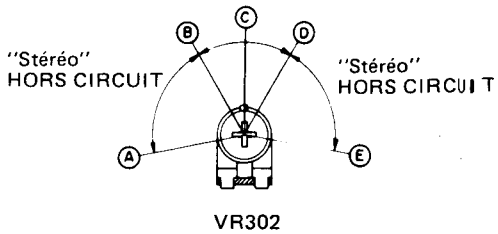
★ EN UTILISANT UN SYSTÈME ALTERNATIF

1. Applique un signal stéréo à partir du générateur ou recevoir une émission stéréo.
2. Ajuster **VR302** jusqu'à ce que l'indicateur stéréo s'éciaire. Coller le bras de **VR302** comme il montré sur la figure.

CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation 10%
Fréquence de modulation. . . Pilote (19 kHz)
Niveau de sortie. . . . . 66 dB



MODULATEUR STEREO
Signal pilote sun "ON" (mise en circuit) . . . 19 kHz
Mode de sortie. . . . . Gauche + Droite



VR302

Ⓐ—Ⓑ,
Ⓓ—Ⓔ..... Position de HORS CIRCUIT "Stereo".
Ⓑ—Ⓓ..... Position de MISE EN CIRCUIT "Stereo". (Eciairage de l'indicateur)
Ⓒ..... Point de réglage du circuit pilote.

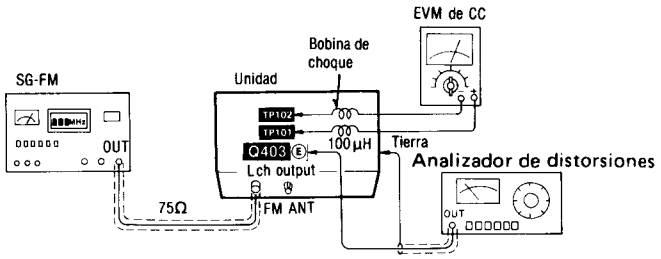
AJUSTE DE DISTORSION MONO FM

1. La conexión del equipo de pruebas se muestra en la figura.
2. Ajustar la unidad a la posición "**FM**".
3. Colocar la puesta del indicador de radiofrecuencia y generador de señales a **100,10 MHz**.
4. Ajustar el nućleo de **T101** de manera que el voltaje medido en modalidad de señal sea **0 mV (0±50 mV)**.
5. Ajustar **T102** de manera que el factor de distorsión de CH I se minimice.
6. Repetir los pasos 4 y 5 algunas veces.
7. Asegurarse de que los factores de distorsión de CH I y CH D sean casi los mismos uno con el otro.

Nota:

El destornillador de ajuste usado debe estar hecho de resina.

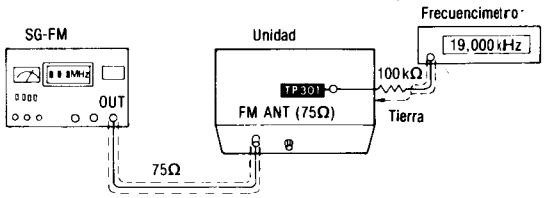
CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación 100%
Frecuencia de modulación ..... 400 Hz
Niveau de salida ..... 66 dB



AJUSTE DE MPX VCO (OSCILADOR CONTROLADO POR VOLTAJE MPX)

1. La conexión del equipo de prueba se muestra en la figura.
2. Poner la unidad en la posición de "**FM/auto**".
3. Coloque el indicador de la radio y la puesta del generador de señales en **100 MHz**.
4. Ajuste **VR302** para **19 kHz±50 Hz** en lectura de frecuencímetro.

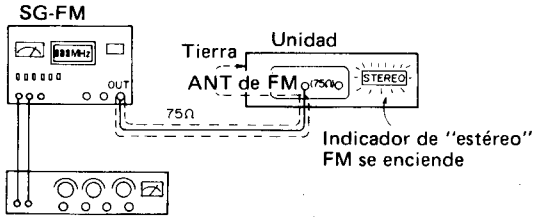
CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación 0
Frecuencia de modulación 0
Niveau de salida ..... 66 dB



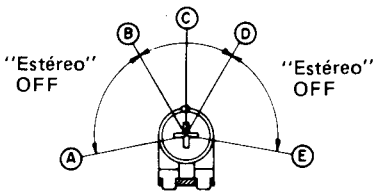
★ USANDO SISTEMA ALTERNATIVO

1. Aplique señal estereofónica del generador o reciba la emisión estereofónica.
2. Ajuste **VR302** hasta que el indicador de estéro se encienda. Cemente brazo de **VR302** como se muestra en la figura.

CONDICION DE GENERADOR
DE SEÑALES DE FM
Modulación. 10%
Frecuencia de modulación. . . Pilot (19 kHz)
66 dB



MODULADOR ESTEREO
Señal piloto a ON. . . . . 19 kHz
Modalidad de salida. . . . . Izquierdo + Derecho



VR302

Ⓐ—Ⓑ,
Ⓓ—Ⓔ ..... Pósición de "estéreo" OFF.
Ⓑ—Ⓓ ..... Pósición de "estéreo" ON. (indicador encendido)
Ⓒ ..... Punto de ajuste de circuito piloto.

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